

# Some example guide

by Javier de la Torre

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# About Antarctic Field Guides

## About the project

The Antarctic Field Guides is a collaborative tool offering free access to information that can help you identify Antarctic organisms. Thanks to the initial efforts from Prof. Andrew Clarke (British Antarctic Survey) and Dr Stefano Schiaparelli (University of Genoa and Italian National Antarctic Museum), it allows users to build a tailor-made, customized guide, to be taken in the field or simply browsed. The pages are generated on-the-fly from the contents of authoritative, quality controlled data resources ([SCAR-MarBIN](#) and [ANTABIF](#)), and ensures the user to access up-to-date information about the group of organisms he/she is particularly interested in. Even if the primary focus is for scientists, the AFGs are open and free for all to enjoy.

## About the data and its usage

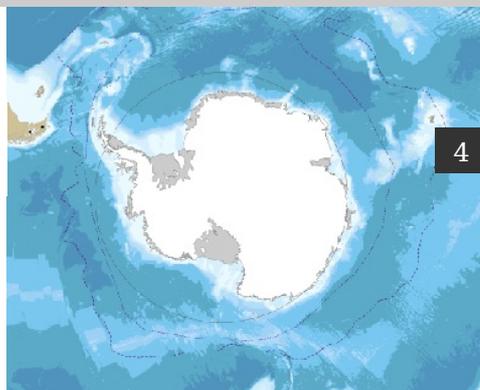
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Scientific name

# Orcinus orca

Animalia Chordata Mammalia Cetacea Delphinidae Orcinus



## Description

Orca or Killer whales are the largest members of the dolphin family. Found in all waters, these splendid, toothed whales are sometimes called the 'wolves of the sea' because of their closely-related pack-like behaviors. Gracing the southern seas in abundance, Orcas tend to travel in small close-knit, family pods but can be found in groups of up to 50 individuals. Orcas have not been caught commercially since the early 1980's as a result of protective measures imposed by the International Whaling Commission (IWC). However, Orcas are still captured in small numbers for display at zoos and marine parks. This is an emotional and controversial issue to be sure, but not one of conservation significance as Orca populations are currently thought to be stable.

Probably the most striking feature of Orca whales is their unique coloration pattern. A dazzling contrast of jet black above and bright white markings beneath help make the Orcas both visually appealing and easily identifiable. Add to that their sleek, streamlined shape and imposing dorsal fins (especially in the adult male) and the result is a truly magnificent animal of the sea.

Orca whales are excellent swimmers and can perform impressive acrobatics in the water. They can often be observed breaching, a behavior in which the whale speeds to the surface and leaps completely out of the water, falling back with a spectacular splash. Or they may be seen 'spyhopping'--poking their heads straight out of the water to get a better look at their surroundings. 'Tail slapping' is another common activity possibly meant as a kind of warning to other members in pod.

Orcas are very efficient and sophisticated predators who often hunt in groups, attacking prey much as wolves attack larger caribou or moose, then sharing the spoils. They eat fish, squid, sharks, birds (including penguins), seals, sea turtles, octopi, and other whales. An Orca will tip up small ice floes to dislodge resting seals while other Orcas wait beneath the surface for the kill. They have even been observed attacking young, but still huge, Blue whales. Aside from human beings, Orcas have no natural enemies. They can dive to depths of up to 100 feet in pursuit of prey but prefer to hunt at or near the surface of the water.

Orcas are very social animals. The bonds between pod members are strong and last for life. Orcas share the responsibility of protecting young, and caring for the sick or injured.

Orca breeding occurs mostly in the winter to early spring. The gestation period is about 16-17 months. Newborn Orca calves instinctively swim to the surface within ten seconds for their first breath, helped along by mother's flippers. Calves are about seven feet long and weigh up to 400 pounds at birth. The mother and calf may stay together for a year or longer. Female orcas reach maturity at 6-10 years old, and males at 12-16 years old.

## Size

25 to 30 feet long

Scientific name

# Hydrurga leptonyx (Blainville, 1820)

Animalia Chordata Mammalia Carnivora Phocidae Hydrurga



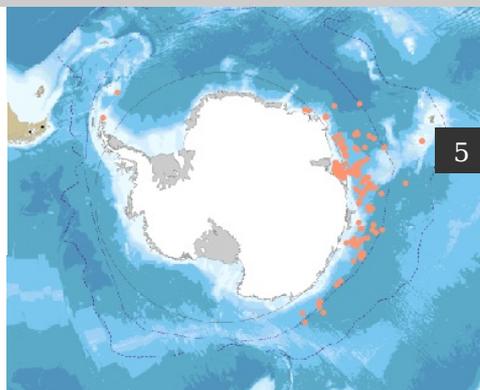
## Description

Long, slim body, with disproportionately large head separated from body by marked constriction at neck. They have a characteristic 'reptilian' appearance to their head; a wide gape of jaws and characteristically three-pronged teeth, which makes identification easy. The teeth of the leopard seal have a dual role; the large re-curved canines and incisors are designed for gripping and tearing prey, whereas the upper and lower tricuspid (three cusped) molars interlock to provide an efficient krill sieve. Leopard seals are sexually dimorphic, the females are larger than the males growing up to 3.8 m in length and weighing up to 500 kg, whereas males grow up to 3.3 m in length and weigh up to 300 kg. Leopard seals have a muscular, somewhat reptilian head, with a sinuous neck, highly arched back and long powerful flippers. The body is dark grey above and light grey below and they have white throats with black spots. These distinctive spots are what give the Leopard seal its name. As one might expect, Leopard seals have impressively long, sharp teeth which are well-adapted for cutting and tearing the flesh of prey. Their streamlined bodies are built for speed and power; their smooth, impermeable skin allowing them to easily slice through the water on pursuit dives. These characteristics combined with excellent sight and smell have established Leopard seals as one of the consummate predators of the Antarctic.

Leopard seals' main source of food is penguins and they can often be seen cruising in the vicinity of Adelie, Chinstrap, and Gentoo colonies. Typically, they will lie in wait by an icy ledge or rock outcrop, pouncing on the first penguin to dive into the water. Leopards will also hunt fish, squid and krill, and occasionally other seals like the Crabeater seal.

Scientists still have much to learn about the reproductive behaviors of Leopard seals due to the difficulty of monitoring breeding sites on the shifting pack ice of the Antarctic. Solitary animals, by nature, Leopard seals come on land only during the breeding season and then only in pairs or small groups. Females dig a hole in the ice early in the austral summer where they give birth to single pup after a 9 month gestation. The female protects the pups until they can take care of themselves.

Leopard seals may live for 26 years or more. Their only known natural predator is the Killer Whale.



## Distribution info

While the majority of the leopard seal population remains within the circumpolar Antarctic pack ice the seals are regular, although not abundant, visitors to the sub-Antarctic islands of the southern oceans and to the southern continents. The most northerly leopard seal sightings are from the Cook Islands. Juveniles appear to be more mobile, moving further north during the winter. Because it does not need to return to the pack ice to breed, the leopard seal can escape food shortages during winter by dispersing northwards. Every 4 to 5 years the number of leopard seals on the sub-Antarctic islands oscillates from a few to several hundred seals. The periodic dispersal could be related to oscillating current patterns or resource shortages in certain years. By comparison, adult seals that remain in Antarctica are much less mobile and remain within the same region throughout the year.

During summer, leopard seals breed on the outer fringes of the pack ice where they are solitary and sparsely distributed. Their density is inversely related to the amount of pack ice available to the seals as haul-out platforms. Pack ice cover varies with the season, from a maximum between August and October to a minimum between February and March. Population densities are greatest in areas of abundant cake ice (ice floes of 2 to 20 m in diameter) and brash ice (ice floes greater than 2 m in diameter), whereas they are least in areas with larger floes. Densities range from 0.003 to 0.151 seals/km<sup>2</sup>, and there is an age-related difference in their spatial behaviour. Due to intra-specific aggression there is a greater degree of spatial separation among older seals.

Scientific name

# Stercorarius antarcticus (Lesson, 1831)

Animalia Chordata Aves Charadriiformes Stercorariidae Stercorarius

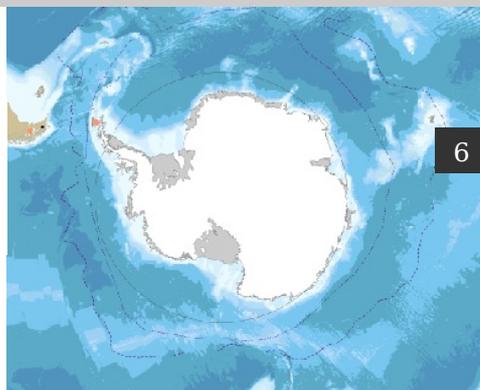


## Description

Current phylogenetic classification: The order Lariformes is represented in high latitudes of the southern hemisphere with three families: gulls, terns and skuas. Herein the skuas (Stercorariidae) for their part occur with three species: *S. maccormicki*, *S. chilensis* and *S. antarcticus*. The latter of which is subdivided into three sub-species: *S. a. antarcticus*, *S. a. lonnbergi* and *S. a. hamiltoni* (Devillers 1978, del Hoyo et al. 1996, Ritz et al. 2008).

## Distinguishing Characters

The most conspicuous feature is a white patch in the middle of the under wing which is formed generally by the basal parts of eight primary feathers. They show this ornament when warning by lifting the wings (e.g. in case of entering the territory; happens in combination with emitting a call, in that case a long call).



## Distribution info

Brown Skuas have a huge area of distribution, which is circumpolar at high latitudes of the southern hemisphere. Their prevailing breeding sites are at Sub-Antarctic Islands within the Antarctic Convergence. But they also breed at islands near New Zealand, representing the northernmost breeding areas. On the other extreme side, Brown Skuas are breeding on islands near the Antarctic Peninsula (not further south than Anvers Island archipelago 64°46' S 64°03' W) (Ritz et al. 2006). An outlying, but however constant, breeding record (the only published one) is a single Brown Skua female which breeds at the western edge of the Ross sea (Port Martin) at the Antarctic Continent/ East Antarctic. That female breeds in a mixed pair constellation with a south polar skua (Barbraud et al. 1999).

The zone of sympatric occurrence with *S. maccormicki*:

In the breeding range of the Brown Skua, there is a zone characterized by an alongside occurrence with another skua species, the South Polar Skua *S. maccormicki*. A 500km wide hybrid zone is located in the West Antarctic, in the area of the Antarctic Peninsula representing the southern and northern extremes of the breeding ranges of Brown- and South Polar Skuas, respectively. The zone ranges from the South Orkney Islands (60°45' S) in the north to the Anvers Island archipelago (about 65° S) in the south (Parmelee et al. 1977, Hemmings 1984, Hahn et al. 1998). Pairs formed by *S. maccormicki* x *S. maccormicki* and *S. a. lonnbergi* x *S. a. lonnbergi* are dominating the numbers and are occurring side by side. The characteristic feature of the hybrid zone is the occurrence of mixed species pairs, formed by *S. maccormicki* and *S. a. lonnbergi*. The percentage of such mixed species pairs varies within that zone and is highest in the northern part; like on Fildes Peninsula/ King George Island were 12 % of all breeding pairs are mixed pairs. These pairs are always formed by a South Polar Skua male and a Brown Skua female. The offspring of mixed species pairs is fertile (Pietz 1984, Ritz et al. 2006).

The hybrid zone has been intensively studied; amongst others in terms of species foraging ecology. In the area of sympatric occurrence, a foraging pattern different from the pattern of circumpolar allopatric occurrence has evolved which is due to species competition. However, Brown Skuas are dominating all terrestrial resources over South Polar Skuas by outcompeting them "so a change in the foraging behavior can be observed only in the South Polar Skua, which is forced to prey on marine resources.

## Size

The Brown Skua *Catharacta antarctica lonnbergi* is evaluated in the Red List of Threatened Species as Least Concern. That is based on: firstly the huge range of occurrence, which is circumpolar, mostly on remote, isolated Sub-Antarctic islands; secondly, the population trend appears to be stable. According to BirdLife International the population is placed in the band 10 000 - 20 000 individuals.

## Habitat

Nests are built at places which are free of snow in early spring compared to the surrounding facilitated by landscape features e.g. small hills or moraines. As nest material they use lichens, grasses and/or mosses depending on the local availability. Like other skua species, the Brown Skua also occupies a territory around the nest which is defended against each intruder by the territory owners, and most vigorously against conspecifics (but also against scientists and unsuspecting tourists) (Trivelpiece et al. 1980). Herein, the size of the territory varies a lot and depends amongst others factors on the breeding location and landscape features. The territory may firstly be: a pure nest territory, defended to protect the brood or secondly an all-purpose territory which includes beneath the nest as well

## Ecology

Within their huge breeding range, Brown Skuas experience a wide variety of climatic conditions, having consequences for the non-breeding period distribution. Brown Skuas do not necessarily migrate big distances but, typically for pelagic birds, they usually do leave the breeding grounds and return to land only for breeding. How far they move depends on the breeding area, whereas the northern breeding populations stay close to the breeding ground and the southern populations migrate further north (Olsen and Larsson 1997). Herein the migration pattern and wintering areas are largely unknown (Furness 1987, Olsen and Larsson 1997). Museum skins and colour slights of *C. a. lonnbergi*-specimens found/sighted at the northern hemisphere appeared to be misidentified being rather South Polar Skuas (Devilleers 1977). Phillips et al. (2007) firstly used tracking devices for getting insight into migration patterns and wintering areas of that species. The study showed that Brown Skuas breeding at Bird Island/ South Georgia are leaving the breeding area and wintering over deep oceanic water in the Argentine basin between the Antarctic Polar Front and the northern sub-tropical-front.

Scientific name

# Mirounga leonina (Linnaeus, 1758)

Animalia Chordata Mammalia Carnivora Phocidae Mirounga



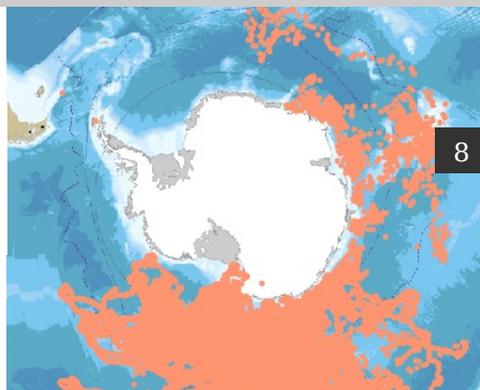
## Description

Southern elephant seals are phocids, or true seals, and are the largest of all seal species. They have a circumpolar distribution, breeding mainly on subantarctic islands. At sea they have been found to inhabit almost all of the Southern Ocean and travel long distances during their foraging migrations. They are highly sexually dimorphic, with males (over 4000 kg) being up to ten times larger than females (~450 kg). Males will attempt to join the breeding system at around seven years of age and may live to 14 years old, whereas the females are recruited into the breeding population from age four and may live to 24 years of age.

Their scientific name, *Mirounga leonina*, is thought to be a combination of the Australian aboriginal name for them "miouroung" for the genus and the latin word for lion as the specific part, due to their roar and threat vocalisations.

## Distinguishing Characters

Elephant seals are the largest of all seals but are also "supermammals" in terms of their diving physiology - they are capable of diving to depths greater than 2000 m and holding their breath in excess of two hours.



## Distribution info

The distribution of southern elephant seals is circumpolar and ranges mainly in subantarctic waters from 16° S at Saint Helena to 78° S. The seals' haul-out locations are typically subantarctic islands lying between 40 and 62° S of the Atlantic and Indian Ocean sectors of the Southern Ocean. While at sea the seals forage widely in the Southern Ocean from the high latitudes around the Antarctic continent to temperate waters around Argentina, Chile, southern Africa, Australia and New Zealand. During these long foraging trips the seals may spend more than 9 months of the year at sea and travel over 5000 km in a round trip. On the basis of their chief haul-out locations, four main breeding populations have been identified: South Georgia (population size ~ 400,000) in the south Atlantic, Iles Kerguelen and Heard Island (~ 220,000) in the Indian Ocean, Macquarie Island (~ 76,000) in the south Pacific Ocean, and on Peninsula Valdez (~ 42,000) in Argentina. There is estimated to be little gene flow between these populations.

The global population in recent years has increased from 664,000 in 1994 to 740,000 in 2001. The increasing population at Peninsula Valdez has mainly driven this overall increase. The South Georgia population has remained stable over the past few decades. The population in the Indian Ocean at Iles Kerguelen and Heard Island has remained stable since 1990 after declining since the 1950s, though the Macquarie Island population has continued to decrease for reasons that are remain unclear. Though only a small population, the Marion Island population, in the south Indian Ocean, has also continued to decrease until recently. The primary reason for these declines between the 1950s and 1990 has been suggested to result from food limitation with inter-island differences attributed to factors such as competition with other species and predation.

## Size

At birth pups weigh 40 kg and are 1.2 m long. Adult females are on average 450 kg and 3 m long, whereas males can weigh over 4000 kg and be 5 m in length.

## Depth of the distribution

Extreme dives to greater than 2000 m. These seals commonly dive between 300 to 1500 m.

## Ecology

Southern elephant seals are major consumers of biomass, primarily squid and fish in the Southern Ocean. The life cycle of southern elephant seals is a combination of terrestrial haul-outs required for breeding (September to November) and moulting (December to March) interspersed with long periods at sea foraging. In the case of juveniles, the adult breeding haul-out is replaced with a mid-year haul-out (April to August).

Scientific name

# Chionodraco hamatus (Linnberg, 1905)

Animalia Chordata Actinopterygii Perciformes Channichthyidae Chionodraco

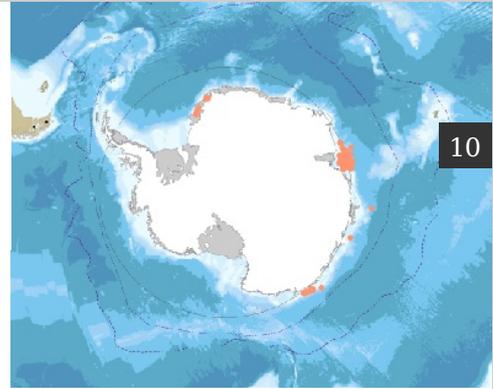


## Description

The characteristic posture of the icefish is "sitting" on the bottom kept by its elongate pelvic fins (Montgomery & Macdonald, 1998).

## Distinguishing Characters

The study of the morphology and composition of the three otoliths (sagitta, lapillus and asteriscus) of the *Chionodraco hamatus* by scanning electron microscopy and X-ray diffraction was carried out by Motta et al. (2009). It possessed a completely Vateritic asteriscus, whereas its sagitta and lapillus were made mostly of aragonite. Parallel analysis of protein patterns in *C. hamatus* revealed that the sagitta significantly differed from the lapillus and asteriscus. The sagitta did not contain the S-100 protein and showed calmodulin and calbindin located in discontinuous or incremental zones, respectively.



## Distribution info

*Chionodraco hamatus* shows a circumpolar distribution, although it is mainly recorded on the continental shelf of East Antarctica down to 600 m depth (Iwami & Kock 1990). The lack of haemoglobin in the blood, which characterises these fishes, has probably played a key role in determining their distribution within the cold and highly oxygenated waters of the Antarctic, where metabolic requirements dependent on temperature are low (Eastman 1993). Consequently, several studies on these species have focussed on their blood physiology, as well as on the structure and function of antifreeze components (Kunzmann 1989, 1991; Wells et al. 1990; Egginton 1996; Währmann 1996, 1997).

## Ecology

The channichthyid *Chionodraco hamatus* is a common icefish within the cold waters of the high-Antarctic zone. It is an endemic species to the Antarctic region. Off Terra Nova Bay, as well as in the Ross Sea, *Chionodraco hamatus* is by far the most abundant and eurybathic icefish, both in terms of biomass and frequency of occurrence (Eastman & Hubold 1999; Vacchi et al., 1999).

*Chionodraco hamatus* spawns in spring (September-October) in the Mawson Sea and throughout summer (December-March) in the Ross Sea, Davis Sea and Weddell Sea (Shandikov & Faleeva 1992; Duhamel et al., 1993; Vacchi et al., 1996). As in other high-Antarctic channichthyids, *C. hamatus* females are characterised by having low fecundity and they produce only a few thousand but large (3.5-5 mm) eggs (Vacchi et al. 1996). *C. hamatus* probably spawns a single batch of oocytes once a year (La Mesa et al., 2003).

Scientific name

# Lobodon carcinophagus (Hombron & Jacquinot, 1842)

Animalia Chordata Mammalia Carnivora Phocidae Lobodon

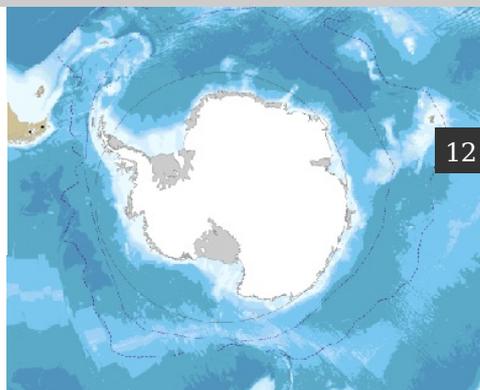


## Description

Crabeater seals have a circumpolar distribution, and are largely restricted to Antarctic pack-ice which makes them difficult to access for scientific study. Adults are 2.0-2.6 m in length, with females slightly larger than males. Weight can vary considerably throughout the year, but are typically in the range of 180-225 kg. Colour is also variable with old, pre-moult coats being silvery white and post-moult coats light to medium brown. The coats are often flecked with darker brown, and tend to be darker on the dorsal surface. They are commonly heavily scarred from encounters with leopard seals, a common predator of young crabeater seals, or from intra-specific interactions as adults during the breeding season. Crabeater seals have highly specialised and distinctive multi-cusped post canine teeth which can interlock to form a sieve when filter feeding on zooplankton.

## Distinguishing Characters

The key distinguishing characteristics of crabeater seals is their relatively uniform colour, as they lack the prominent spots and streaks of Weddell, Ross and leopard seals. They are generally smaller, more slender and lighter in colour than elephant seals which may also be found in the pack-ice. They have a blunt, square shaped snout in comparison to other seals, and very distinctive multi-cusped teeth.



## Distribution info

Crabeater seals are found almost entirely in the Antarctic pack-ice, with only occasional vagrants hauling out on sub-Antarctic islands north of the polar front, or even more rarely on the coast of Australia, New Zealand, Africa and South America. Within the pack-ice, their distribution seems to be largely determined by that of the primary prey, Antarctic krill. Tracking studies have shown that in the West Antarctic Peninsula they occur on the continental shelf, while in Eastern Antarctica highest densities are associated with the continental shelf break or the marginal ice zone.

## Size

The global population size of crabeater seals and its long term trends are unclear. This uncertainty is due to extreme difficulty of conducting synoptic circumpolar surveys in the pack ice regions used by the seals. Estimates from the 1970 and 1980s put the global population at around 30 million seals, but these were revised down to 12 million as data improved in the 1990s. It has also been suggested the crabeater seal population increased throughout the 20th century as a consequence of increased krill availability arising from the decline in whale numbers. Despite some demographic data supporting this idea, there are no systematic survey data from before whaling to test the hypothesis. SCAR coordinated an international pack ice seal survey in 1999-2001 which estimated the population of eastern Antarctica (64°E-150°E, one quarter of the continental coastline) to be 914,200 seals (95% confidence limits: 698,600-1,302,000). Differences in the methodologies between this and earlier surveys in the region, prevented an assessment of trends, and there is still no revised global estimate for population size for this species.

## Habitat

Crabeater seals are regarded as pack-ice obligate, using the floes as a substrate for breeding and resting, and foraging for krill in the waters beneath them.

## Depth of the distribution

Crabeater seals typically dive deeper during the day than at night as they follow the vertical migration of their prey, but the overall dive depths vary considerably regionally. In the West Antarctic Peninsula, mean day time dives depths are 158 m compared to 73 m during the night. This is consistent with the seals using krill swarms compressed along the ocean floor during the day, and at night foraging on krill that are more dispersed throughout the water column. In eastern Antarctica, dives are very much shallower, generally less than 20 m. It is important to note that the West Antarctic Peninsula studies were conducted in late autumn and winter while the Eastern Antarctic studies were in spring and summer so these differences may be due to some extent to seasonal differences in the behaviour of krill. The deepest dive recorded for a crabeater seal is 664 m and the longest 23.6 min.

## Ecology

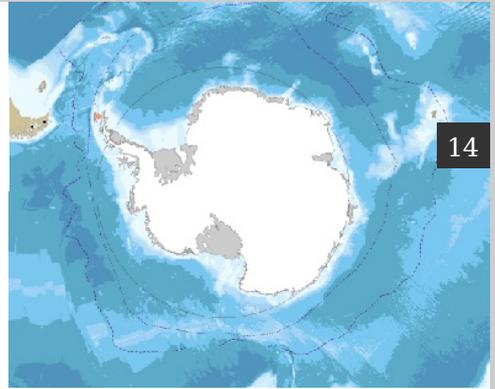
Crabeater seals may be one of the most abundant large mammals in the world, but paradoxically relatively little is known about their basic biology. Mortality in the first year of life is as high as 80%, largely due to predation by leopard seals. Other sources of mortality are killer whales, which have been seen hunting together to take adult crabeater seals off ice floes. They typically live for 20-25 years, but can live for up to 40 years.

There is a strong diel cycle to the seals haul-out behaviour. On average adult seals spend 20-30% of each day hauled out on ice floes, but this varies both with the time of day and with the time of year. On the WAP, the seals hauled more at night and focused foraging activity during the daylight hours. By the end of August the seals switch to hauling out during the day and foraging at night, which is also the pattern in the Ross Sea and EA. The change in haul out behaviour most likely reflects changes in the behaviour of their prey and the strategies that the seals use to catch their prey.

Scientific name

# Styela wandeli (Sluiter, 1911)

Animalia Chordata Ascidiacea Stolidobranchia Styelidae Styela



## Description

Pinkish-red, wrinkled and leathery, with a short stalk. Looks similar to *Molgula enodis*, but has longer siphons and a rough surface. This is a small ascidian, growing to only 1 or 2cm high.

## Distribution info

Found below 10m around the Antarctic Peninsula and Continent.

## Ecology

*Styela wandeli* has been found growing on the surfaces of other ascidians, including *Cnemidocarpa verrucosa*, *Pyura obesa* and *Molgula pedunculata*.

Scientific name

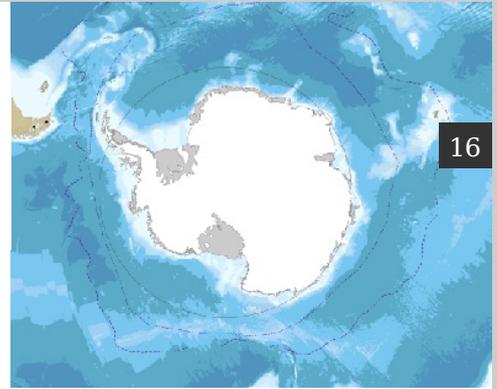
# Diomedea exulans Linnaeus, 1758

Animalia Chordata Aves Procellariiformes Diomedidae Diomedea



## Description

Albatrosses are considered by many to be the most majestic of all Antarctic birds. Their long, narrow wings are strikingly graceful. Equally impressive are the large heads featuring massive hooked bills. Their bodies are mainly white and they have long necks, short legs, and mostly short tails. Albatrosses are supreme gliders; with modified wings to maximize the updrafts and thermals over the open ocean. Albatrosses are best observed during rough weather, when high waves create strong uplifting air currents, enabling them to remain aloft with hardly a wing beat for hours on end.



## Distribution info

Southern Seas

## Size

18 pounds

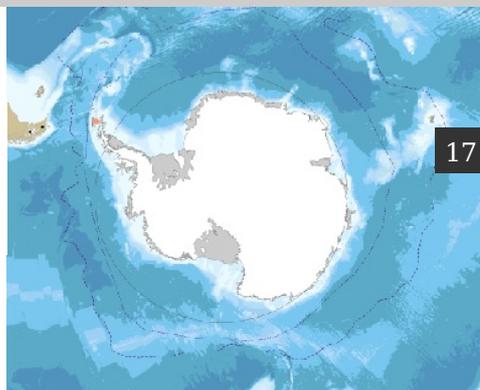
Scientific name

# Sycozoa sigillinoides Lesson, 1830

Animalia Chordata Ascidiacea Aplousobranchia Holozoidae Sycozoa

## Description

Usually white-brown in colour. This clearly stalked animal varies from a few to about 10cm long – the stalk is about 5mm diameter. The species is quite flexible and soft to touch, though the lower stalk is more firm and – plasticity –. The near transparent zooids can clearly be seen arranged around the common terminal cloaca. Similar species include *Sycozoa gaimardi* which is known from the magellanic and northern Antarctic Peninsula regions.



## Distribution info

15m to deep water, on hard substrates from Tierra del Fuego and the Falkland Islands to Subantarctic, Scotia Arc, Antarctic Peninsula and probably Continental Antarctic coasts.

## Ecology

There are probably other Antarctic species in this genus, or this species may really be several cryptic species. Colonies are usually found attached to other animals, such as sponges, erect bryozoans, large ascidians, brachiopod shells but they do also occur on rock. They are suspension feeders and eat phytoplankton.

A number of stalks can be seen with the heads chewed off though their predators are not known.

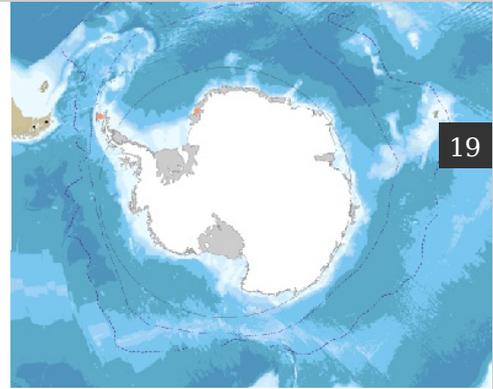
Scientific name

# Ascidia challengeri Herdman, 1882

Animalia Chordata Ascidiacea Phlebobranchia Ascidiidae Ascidia

## Description

Yellowish and translucent, but often covered in sediment so that its appearance is obscured, however the siphons are distinct. The main body lies flat along the substrate, growing to a length of 17cm.



## Distribution info

15 to 637m, found on a wide range of substrates from Sub-Antarctica to the Antarctic Peninsula and Continent.

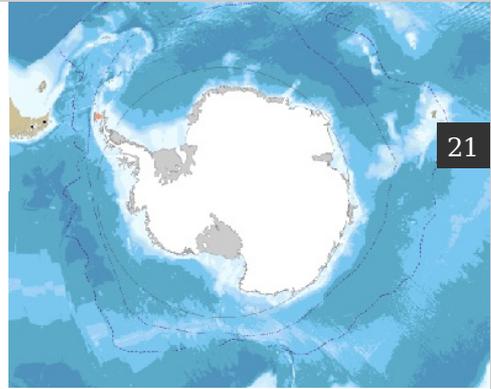
## Ecology

*Ascidia challengerii* has been shown to grow fast at first (up to 7.5cm in two years), but growth slows as it gets older. It is a suspension feeder, mostly sifting out detritus that has been re-stirred up from the sea floor. Ascidians have a low energy content and appear to be generally unattractive to potential predators, although they have occasionally been found in the stomachs of fish and brittle stars. *Ascidia challengerii* spawns during the Antarctic summer.

Scientific name

# Molgula enodis (Sluiter, 1912)

Animalia Chordata Ascidiacea Stolidobranchia Molgulidae Molgula



## Description

Small (a few cm) and usually orange or red with a stalk. The test is covered in fine hairs.

## Distribution info

Found below about 10m around the Antarctic Peninsula and Continent.

Ecology: This is an uncommon ascidian and very little is known about it. It has been found growing on other, larger species of ascidians, such as *Ascidia challengerii*.

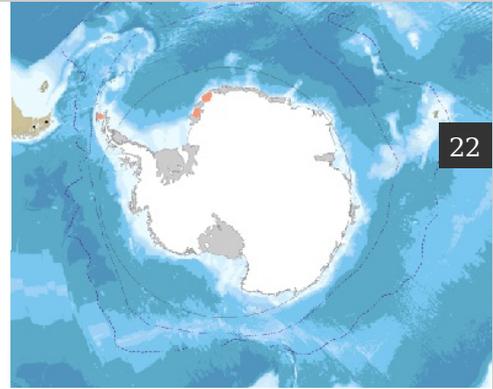
Scientific name

# Pyura discoveryi (Herdman, 1910)

Animalia Chordata Ascidiacea Stolidobranchia Pyuridae Pyura

## Description

Usually red, with a tough, wrinkled, leathery test. *Pyura discoveryi* grows up to about 10cm long.



## Distribution info

15-680m. Generally found growing in clumps or patches from Sub-Antarctica to the Antarctic Peninsula and Continent.

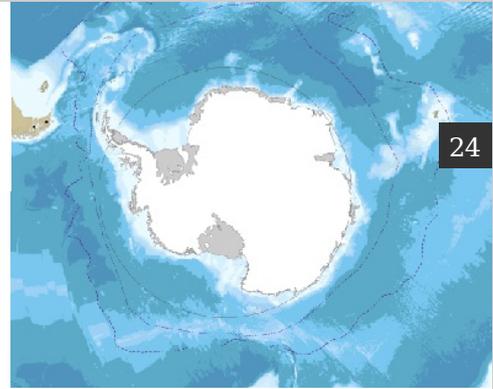
## Ecology

*Pyura discoveryi* is a suspension feeder. Like most ascidians it will often grow on the surface of other organisms such as sponges and larger ascidians.

Scientific name

# Balaenoptera musculus

Animalia Chordata Mammalia Cetacea Balaenopteridae Balaenoptera



## Description

Largest of Earth's animals, the majestic Blue whale can be found in all the world's oceans. In summer, they frequent the fringes of the polar ice shelves, moving to tropical and subtropical waters during the winter months. They travel alone or occasionally in pairs, with the larger individuals occurring the farthest south. Once numbering close to 200,000 individuals, Blue whales were heavily exploited for their oil, meat, and baleen during the early to mid 1900's, severely reducing the species' population to near the point of extinction. Since the International Whaling Commission (IWC) imposed a hunting ban in 1966, Blues have returned to several areas of their former range, but recovery is slow (current populations are only 1% of their former numbers).

Blue whales are so named because their skin has a light-gray-and-white mottled pattern, which appears light blue when the whale is just below the surface of the water on a sunny day. Researchers use these skin patterns, which are unique to each animal, as a means of individual whale identification. Aside from the animal's massive size, distinguishing characteristics include its habit of showing its flukes when diving (other rorqual whales do not). Also, they have an unusually small dorsal fin which is set far back on the body.

Blue whales produce reverberating, low-frequency moans that can be heard in deep ocean waters up to 100 miles away. These moans enable the whales to remain in contact across a vast expanse of ocean.

Despite their enormous size, the Blue Whale's diet consists almost entirely of krill, tiny shrimplike crustaceans occurring in all oceans of the world. Feeding by lunging open-mouthed into dense groups of such creatures, they can consume as much as 4.5 tons in a day. Water and food rushing into the whale's pleated, expandable mouth is forced past hundreds of wide, black fringed baleen plates that hang from the roof of the mouth. The plates act like a sieve or comb, trapping the solid food inside the fringes and expelling the excess water. Occasionally working in pairs, Blue whales have been observed weave through schools of krill, apparently using each other's bodies to block the escape of their prey.

Female Blue whales reach sexual maturity at approximately 5 years of age. They may give birth once every two or three years. Mating occurs during the summer season, and the gestation period lasts about 11 months. A single calf is usually born the following spring; twins are rare. The calves nurse for seven or eight months, gaining as much as 200 pounds per day in the nutrient-rich Antarctic or Arctic waters.

## Size

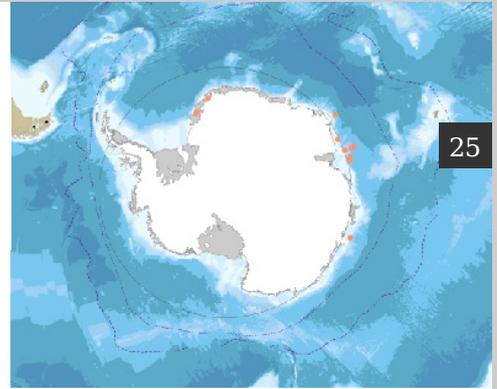
85 to 100 ft long

Scientific name

# Dissostichus mawsoni

## Norman, 1937

Animalia Chordata Actinopterygii Perciformes Nototheniidae Dissostichus



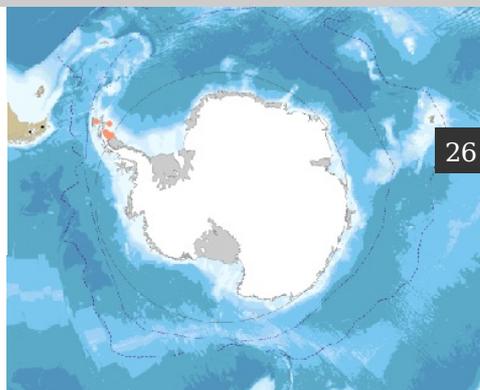
Scientific name

# Corella eumyota Traustedt, 1882

Animalia Chordata Ascidiacea Phlebobranchia Corellidae Corella

## Description

Colour is ivory or grey. Corella eumyota sometimes has a short stalk, and grows up to 24cm long.



## Distribution info

0 to 842m, but not usually found shallower than 20m. Corella eumyota occurs on a variety of substrates around Antarctica and the Sub-Antarctic and in temperate waters such as New Zealand, South Africa and southern Australia. It has also been recently (July 2002) found off northern France where it has probably newly invaded from southern waters. This is the first record of it in the northern hemisphere.

## Ecology

*Corella eumyota* has been shown to grow fast at first (up to 14.4cm in two years), but growth slows as it gets older. It is a suspension feeder, mostly on material stirred up from the substrate. It broods its young until they are well developed and they settle a few minutes after release, so *Corella eumyota* is often found in clumps. Spawning occurs in the Antarctic summer.

Scientific name

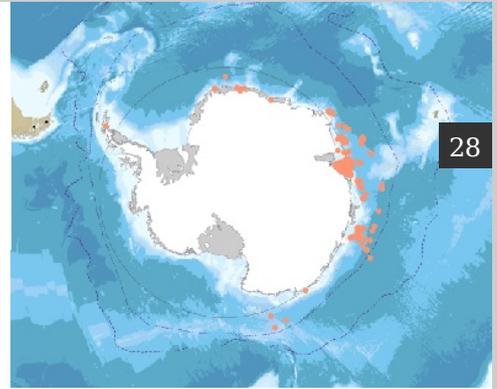
# Leptonychotes weddellii (Lesson, 1826)

Animalia Chordata Mammalia Carnivora Phocidae Leptonychotes



## Distinguishing Characters

Small head relative to body size, unique body markings



## Distribution info

Antarctic circumpolar - the most southerly distribution of any seal

## Size

Females average ~2.5 metres in length, females weigh anywhere from 250-550kg

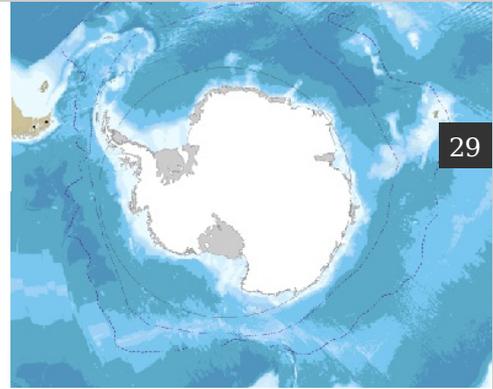
## Habitat

fast ice

Scientific name

# Phalacrocorax atriceps

Animalia Chordata Aves Ciconiiformes Phalacrocoracidae Phalacrocorax



## Description

The Blue-eyed Shag, or Cormorant, is found on the western side of the Antarctic Peninsula, the Scotia Arc, South Georgia and the western coast of South America. They are the only member of the Cormorants to venture down into the Antarctic proper, with colonies found as far as 68 degrees south. They are unique among Antarctic and sub-antarctic birds in that they will maintain a nest year-round where the sea is open and they actively avoid pack ice. They were welcomed by the early explorers and sealers because they never ventured far from their nest site out to sea, and thus, were a sure sign of approaching land.

Blue-eyed shags are characterized by a vivid blue eye color and an orange/yellow growth at the base of their beaks that becomes particularly large and bright during the breeding season. They have a white-breast, a black back and largely white cheeks and neck. The bill is dark brown and the feet pink.

Blue-eyed shags feed mainly on fish and invertebrates, often forming dense "rafts" at sea of hundreds of birds that continuously dive down onto the shoals below looking for fish. By fishing in such large groups they help each other by panicking the fish into having nowhere to go except into the beak of the next bird. They are excellent divers with a recorded maximum dive of 400 feet. Once underwater they are able to use their powerful webbed feet to propel themselves rapidly in search of food.

The nests of these gregarious birds are built on cliff tops close to the ocean. The colonies can become quite raucous and lively affairs, especially during the breeding season. Courtship activities begin in late August to early October. Up to three eggs are laid in October through to early January and these hatch in November to February. Unlike other Antarctic birds, Shag chicks are born "naked", meaning without any down feathers. This makes them susceptible to extreme weather and especially dependent on their parents when very young. Fledging occurs in January to March, and the adults leave the colonies in April.

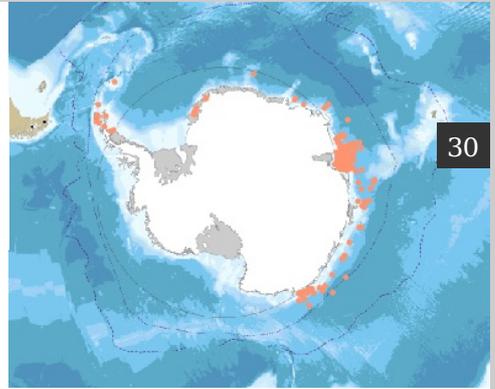
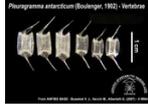
The main predators of Blue-eyed shags are the sheathbill, which steals eggs from the nest, and leopard seals, which attack the birds at sea.

Cormorants do not seem to be under any current threat, however, but some populations are so small (a few hundred pairs) that their status needs monitoring.

Scientific name

# Pleuragramma antarcticum Boulenger, 1902

Animalia Chordata Actinopterygii Perciformes Nototheniidae Pleuragramma



## Distribution info

Pleuragramma antarcticum has a largely circumpolar distribution: Weddell Sea, Bellingshausen, Ross Sea, Davis Sea, Oates, Adelle, Wilhelm, Prydz Bay, Antarctic Peninsula, South Shetland and South Orkney Islands, South Georgia Island.

## Ecology

This is a pelagic fish found in temperatures ranging from 2.1 to -1.4 Å°C. It inhabits both open waters and areas of pack ice in mid-waters. *P. antarcticum* is described as the most dominant pelagic fish in Antarctica, accounting for over 90% of the fish community in number and biomass (DeWitt 1970, Hubold & Tomo 1989).

The most commonly reported food items of *P. antarcticum* include krill, copepods, amphipods, euphausiids, molluscs, polychaetes, chaetognaths and ostracods. They may also switch to cannibalism in the absence of an adequate food supply.

*P. antarcticum* constitutes the diet of the large Antarctic predators such as whales (Andriashev 1965; Lauriano et al. 2007), elephant seals (Daneri & Carlini 2002), fur seals (Casaux et al. 2003) and Weddell seals (Burns et al. 1998, Fuiman et al. 2002); in winter, it is even consumed by crabeater and leopard seals (Lowry et al. 1988). It is an important component of the diets of gentoo, AdÁ©lie and emperor penguins (Ainley et al. 1998, Cherel & Kooyman 1998, Polito et al. 2002), and of birds such as skuas (Mund & Miller 1995), cormorants (Casaux et al. 1998) and cape pigeons (Creet et al. 1994). It is also a regularly occurring item in gut contents of other fish (Eastman 1985, 1999).

The life cycle of *P. antarcticum* begins in winter (August), when adults migrate inshore to spawn off the great ice shelves of Antarctica (Kellermann 1986). Compared to other nototheniids of the high Antarctic zone, both absolute and relative fecundities of *P. antarcticum* are unusually high, attaining about 18,000 eggs/female and 160 eggs/g, respectively (Hubold 1991, Kock & Kellermann 1991). Unlike other species, most of which spawn large eggs on the sea bottom, *P. antarcticum* spawn pelagic eggs of small size (about 2 mm) floating more or less freely in the platelet ice under the sea-ice cover (Vacchi et al. 2004). As a result, egg predation by other fish species, commonly reported in benthic feeders (La Mesa et al. 1997, 2004), is probably prevented or largely reduced by the inaccessibility of this unusual brooding site.

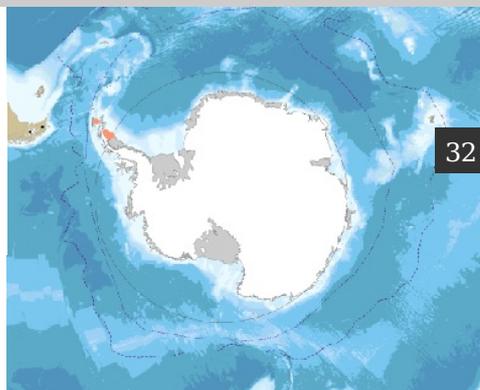
Scientific name

# Molgula pedunculata Herdman, 1881

Animalia Chordata Ascidiacea Stolidobranchia Molgulidae Molgula

## Description

As its name suggests *Molgula pedunculata* usually has a long stalk or peduncle, which may have fine hairs on it. It is large and fairly translucent and is typically 10-20cm.



## Distribution info

10 to 437m [shallow depths all from Dave-check ok#], but generally below 100m, from Sub-Antarctica to the Antarctic Peninsula and Continent. *Molgula pedunculata* has a holdfast which allows it to attach to both hard and soft substrates [??#], and it often grows in patches or dense clumps.

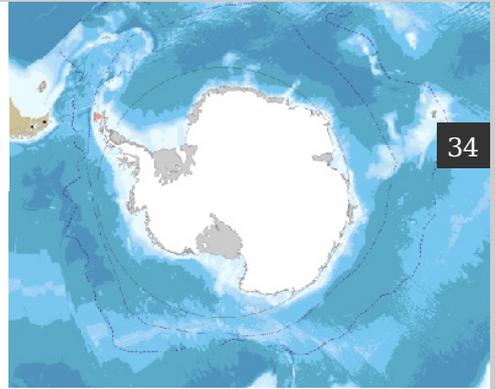
## Ecology

Antarctic ascidians grow relatively fast, appearing to be an exception to the Antarctic tendency towards large, slow-growing invertebrates. *Molgula pedunculata* has been shown to grow fast at first (up to 16.8cm in two years), but grows slower as it gets older. It is a suspension feeder, feeding mostly on resuspended benthic material, and it spawns between August and November.

Scientific name

# Pyura obesa Hartmeyer, 1919

Animalia Chordata Ascidiacea Stolidobranchia Pyuridae Pyura



## Description

Yellow or orange and flask-shaped. This large ascidian grows up to 22cm long.

## Distribution info

20 to 220m, found on sediment from Sub-Antarctica to the Antarctic Peninsula and Continent.

## Ecology

*Pyura obesa* is a suspension feeder and larger individuals have been found with varied organisms such as algae, bryozoans and other ascidians growing on them.

Scientific name

# Aptenodytes forsteri Gray, 1844

Animalia Chordata Aves Sphenisciformes Spheniscidae Aptenodytes



## Description

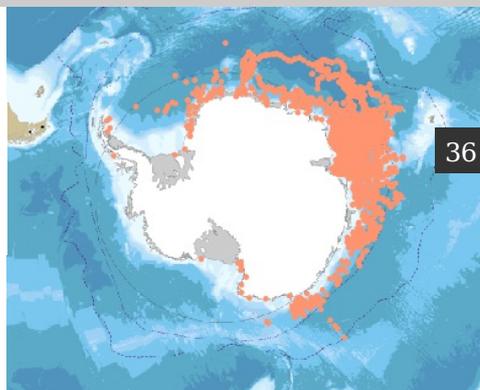
Emperor penguins are the largest and heaviest member of the penguin family. Males and females look alike but their songs differ. Measured from the tip of their beaks to the tip of their tails they are approximately 1 m long but when they are upright they stand about 70 cm tall. Their necks comprising 13 vertebrae are flexible and highly extendable. When an adult pulls in its head, the cervical vertebrae form a strong S-bend and shorten the appearance of the penguin.

The bodies of emperor penguins are cigar shaped and streamlined. The flippers are about 35 cm long and are highly specialised for fast underwater movement of around 14 km/h. Head, chin, throat and neck are black and contrast strongly with the auricular (ear) patches where the colours changes from a deep yellow on the top to a pale yellow to nearly white at the bottom. The upper part of the chest is soft yellow but most of the chest and underside of the flippers are a soft white which is demarcated from the dark grey-blue back by a black stripe. The beak is narrow and long with a curved tip. The mandibles are black and the mandibular plates on the lower mandible range in colour from pink to lilac. The feet and legs are black and the iris is dark brown.

The body mass is highly variable throughout the year. When arriving at the colony in late autumn, the penguins tend to weigh 30-40 kg, sometimes more. During courtship, mating and laying the penguins usually rely on their accumulated body reserves as the ice edge is often too distant to go on regular foraging trips. Most females weigh well less than 30 kg when they depart the colony after laying. Upon their return some two months later they are well fed while the males who have fasted for nearly four months have lost a third to half their body mass and weigh less than 25 kg. At the end of the breeding season, all adults need to fatten again in preparation for the annual moult.

It takes about 5 years for an emperor penguin to acquire its full mature plumage. Juveniles lack the yellow feathers on the chest and the ear patches. Their throats and chins are a soft grey and their beaks are entirely black.

Chicks are covered in soft grey down but their heads are black with a white mask around the eyes.



## Distribution info

Emperor penguin colonies occur right around the Antarctic continent. Most but not all colonies are situated on the fast ice (sea ice that is attached to the continent). About 40 breeding colonies are known to exist. Some of them still need to be confirmed.

The at-sea distribution varies throughout the year. During the breeding season, the penguins need to stay relatively close to the colony (~ 100-200 km) to provision their chicks regularly. However, post breeding, the adults travel much larger distances and move farther north than during chick rearing when they prepare themselves for the annual moult. Fledglings that depart the colonies for the first time travel even farther and can reach latitudes near 54°S.

## Size

Because of the remoteness of many of the emperor penguin colonies it is very difficult to establish a global population size. Many colonies have not been visited for several decades and recently found ones still need to be confirmed. There are just over 40 colonies that vary in size from a few hundred to a several ten thousand pairs. The largest known colonies (~16,000+ pairs) are located in the Weddell and Ross seas. Cape Washington, Ross Sea, is the largest known breeding colony where on average some 20,000 chicks hatch.

In 2009, British scientists used satellite images to look for emperor penguin colonies around Antarctica. This technology may prove useful as a tool to monitor remote colonies in the future and enable scientists to obtain much better information on the status of the global emperor penguin population.

## Habitat

Ice breeding emperor penguins can establish breeding colonies only in areas where the fast ice is stable, provides a reliable platform and persists well into summer. That is why breeding colonies of emperor penguins are usually found far south and far away from the edge of the fast ice, which is prone to destruction by wind and waves during storms. Note, however, that three colonies are known to be located on solid land where flat ground is available.

Since glaciers or ice tongues are often near the breeding areas, the colony locations occasionally must shift when ice bergs calve off the glaciers. Even during the breeding season, the penguins are highly mobile and can shift their location up to several kilometres, particularly in the largest of the ice-breeding colonies.

## Depth of the distribution

Emperor penguin are exquisite divers and champions among the seabirds. Most of their foraging dives range from 150 to 250 metres but they are capable of much deeper dives. One of the deepest dives recorded for an adult emperor penguin went to 564 metres. The penguin was on his first foraging trip after the long incubation period. Incredibly, not only did he dive to this enormous depth, he repeatedly went to more than 500 metres on the same day! These very deep dives lasted up to 9 minutes.

Most of the time emperor penguins dive for 3 to 6 minutes. They do this because within this time frame they are able to utilise the oxygen that is stored in their blood, lungs, and importantly, in their muscles. As long as they can use oxygen, there is no buildup of lactic acid in the muscles and they can quickly recover from their dives. On very rare occasions, however, emperor penguins must hold their breath for much longer. It appears that in winter and early spring when they are hunting in the packice, their dive holes close as wind and waves move the ice floes around. The penguins have to work very hard to find another opening to get out of the water and sometimes, very rarely, they get stuck under the ice for very long periods. The longest dives recorded lasted about 22 minutes. The penguins had dived to only 60 or 70 metres from shallow

## Ecology

Emperor penguins are the only vertebrate species that breeds during the Antarctic winter. Colonies start to assemble approximately in April when the fast ice is stable enough to support them. For several weeks, the birds are occupied finding mates, creating pair bonds and eventually mate. The females produce only one egg which is quite small compared to the body size of penguins. Eggs weigh around 460 g which is less than 2% of the body mass of a 28 kg female.

Since only the male penguins incubate the eggs, the females have to pass over the egg to their partners. It is no easy task to move a roundish egg with a long, narrow beak quickly across the ice onto the partner's feet! In temperatures of less than  $-20^{\circ}\text{C}$ , the eggs quickly freeze if exposed for too long. The males scoop up the eggs onto their feet and cover them with a fold of their skin. Part of this skin fold is feather-free so that the father's body heat can be transferred directly onto the egg. The incubation temperature is roughly  $37^{\circ}\text{C}$ .

While the females leave the colonies to feed in the pack ice (zone of sea ice made up of ice floes) or in polynyas (ice-free areas in the sea ice area), the males incubate their eggs for about 65 to 70 days. During this period, they cannot hunt and are entirely reliant on the body reserves they deposited before returning to their colonies in late autumn.

Although their huddling behaviour makes it possible to stretch out their energy reserve, if these body reserves are insufficient, the males run the risk of either starving to death or having to leave the egg and venture out to sea to feed again.

Of great importance to the incubating males is access to fresh snow. The care of the egg prevents them from going to forage at sea. However, their bodies are still metabolising the energy stores and hence produce waste products. Each time a male defecates water is lost from its body. To make up for this water loss the males need to eat snow.

The females return to their colonies in mid- to late July to relieve their mates. The chicks have usually hatched by then and weigh around 300 g. Their eyes are open and they are capable of some limited locomotion. However, the chicks are not yet able to regulate their own body temperature. Hence, they need to be brooded by their parents for about 50 days. Growth is slow during this time as their chicks need to remain small enough to fit into the brood pouch. Both parents share the brooding duties.

The fast-breaking foraging trips of the males vary in duration and depend upon how far the fast ice extends from the colony. It is not uncommon though that the first trip lasts 2-3 weeks. While the males are at sea replenishing their body reserves, the females bond with their chick and feed it on demand for as long as they still carry food in their stomachs. The food consists of small fish, particularly the Antarctic silverfish *Pleuragramma antarcticum*, Antarctic krill *Euphausia superba*, and assorted squid.

Around September, the chicks are able to maintain their body temperature at  $\sim 39^{\circ}\text{C}$ . They now start to grow quite rapidly and require so much food that both parents have to provision them. The chicks start to form creches, which offer warmth and protection for predators, such as Antarctic skuas (*Catharacta maccormicki*) and Southern giant petrels (*Macronectus giganteus*).

By mid-December, the chicks can reach a body mass of some 20 kg although many are lucky to reach 13-15 kg. How heavy they are in summer depends on how much food their parents managed to secure and how often the chicks have been fed in the previous months. Like their parents they need sufficient body reserves if they are to survive the moult from down to juvenal feathers which will make them waterproof and able to go to sea. The chicks often leave the colonies well before the last bit of down has been shed.

Breeding adults have to decide for how long they continue to feed their offspring. If they abandon the chick too soon, it will perish. If they feed it for too long, they might put their own survival at risk because they need a certain time to forage intensively to get ready for the annual moult. Adults who either did not breed in a given season or who lost their egg or chick early on can be found in colonies moulting already in mid-December. Most breeders though commence their moult in late January. It takes about 3 weeks for the entire plumage to be exchanged. The old feathers are quite worn and are pushed out by the new ones developing underneath the skin. The blood flow to the flippers is increased to the point that their thickness doubles. Growing feathers is energetically expensive and a lot of blood is needed to carry the necessary nutrients into the flippers.

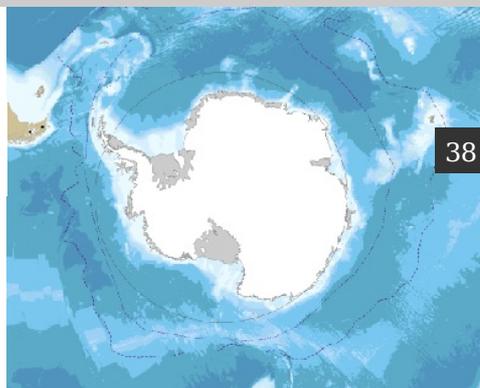
At the end of the moult, the penguins are skinny and often weak. They must return to sea and start feeding again in preparation for the next breeding season.

Meanwhile, the young penguins remain at sea. Not only do they travel vast distances away from their natal colonies, they often swim north and leave the pack ice far behind them. Usually in late autumn they turn back towards the continent but usually do not return to their colonies until they are sexually mature ( $\sim 5$  years old). Only occasionally young penguins are seen in breeding colonies.

Scientific name

# Pygoscelis antarctica

Animalia Chordata Aves Ciconiiformes Spheniscidae Pygoscelis



## Description

The Chinstrap penguin is the second most abundant Antarctic/subantarctic penguin, after the Macaroni. They are mainly concentrated in vast colonies along the coast of South Orkneys, South Shetlands and South Sandwich Islands. There are also small breeding colonies on the Balleny Islands, south of New Zealand. Although population changes have been detected among colonies on the Antarctic Peninsula, the overall Chinstraps population seems stable.

Individuals of this species are recognized by the narrow band of black feathers which extends from ear to ear, just below the chin and the cheeks, hence the name. This distinctive, thin black line distinguishes Chinstraps from Adelies and Gentoos, the other two members of its genus. Chinstraps are also smaller than Gentoos

The diet of the Chinstrap consists of: small shoaling animals, krill, small fish and other roaming marine crustaceans. They are considered near-shore feeders foraging among the pack ice, although vagrants may occasionally be seen in the open sea. They feed by pursuit-diving for prey close to their breeding colonies. Diving effort is usually concentrated near midnight and noon and dives typically last less than a minute and are seldom more than 200 feet deep. Like most penguins, Chinstraps using their flippers to 'fly' at speeds of up to 20 miles per hour. On land, Chinstraps often 'toboggan' on their stomachs, propelling themselves by their feet and flippers. They climb out of the water and up steep slopes using all four limbs and they are able to jump large distances to reach footholds.

Chinstrap penguins lay two eggs in November or December and the chicks fledge at about seven to eight weeks in late February and early March. Unlike other penguins species where the stronger chick is fed preferentially, Chinstrap parents treat both chicks equally. Scientists believe that extensive sea-ice persisting close to shore can restrict access to the sea for foraging adults and therefore impact chick survival.

Although Chinstrap penguins are not considered to be migratory, they do leave their colonies and move north of the pack ice in March through to early May for the winter.

The principal predator of adult Chinstraps is the Leopard seal, while the main predators of eggs and chicks are sheathbills and the Brown skua.

## Distribution info

Antarctic peninsula and southern islands

## Size

27 inches tall

Scientific name

# Pygoscelis adeliae (Hombron & Jacquinot, 1841)

Animalia Chordata Aves Ciconiiformes Spheniscidae Pygoscelis



## Description

One of the most common and well-known of all Antarctic penguin species, Adelie penguins can be found forming colonies on islands, beaches and headlands all around the Antarctic coast. The sight of thousands of them waddling and sliding to the water's edge and then, at the appropriate moment, diving headlong into the frigid Antarctic waters, has thrilled Antarctic visitors for generations. Early explorers made use of the ubiquitous Adelie not only for endless entertainment but also as a source of eggs and tough, but tasty meat. Scientists today use the Adelie as an indicator species to monitor the abundance of krill, so important to the web of Antarctic life.

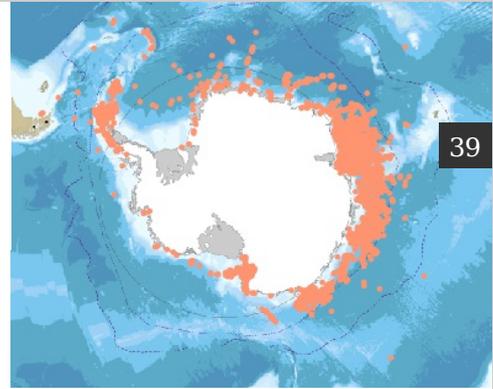
The Adelie penguin is the stereotypical penguin. With its white 'tuxedo shirt' front, and the white ring around its eyes, the bird has a handsome, yet comical appearance. Its beak is reddish with a black tip.

Adelies vacate their winter quarters on the comparative warm Antarctic ice pack and arrive at the rookeries during September and October, often scampering several miles over the sea ice to reach their ancestral coastal homes. They typically establish dense colonies on the ice-free slopes of rocky coasts, headlands and islands. Competition for nesting sites can be fierce and the older more dominant birds tend to stake nests in the middle of the colony where they are better protected from marauding skuas.

A mating pair of Adelies will build a rocky nest of small stones carried in the birds' beaks and dropped into place. Two greenish-white eggs are usually laid in early November. Males and females take turns incubating the eggs, however, the female returns to the sea first, often leaving the male to stand alone for up to ten days while she feeds.

Hatching occurs after about 35 days. The chicks are brooded closely by their parents for the first two to three weeks. While the two chicks hatch almost simultaneously, inevitably one chick is stronger and is better able to win food, which is regurgitated from the crop of whichever parent is present at the time. Growing rapidly, the chicks soon develop a thick woolly gray down and quickly become almost as large as their parents. During the third or fourth week they huddle with other chicks in nursery groups called 'crèches' for both protection and warmth. This leaves the parents free to go to sea on feeding forays in order to satisfy their chicks' increasing appetites. Often, a parade of adults can regularly be seen moving between the colony and the sea on such feeding trips. By late March most of the chicks can swim and the Adelies then depart for the pack ice and the sea.

The Adelie's main oceanic predators are leopard seals which often lie in wait beneath the ledges to snare the first penguin into the water.



## Distribution info

Antarctic continent peninsula, and islands.

## Size

About 30 inches tall

## Habitat

In winter, Adelies stay at sea, resting on pack ice and icebergs in groups.

## Depth of the distribution

Adelie penguins can dive up to 500 feet for prey

## Ecology

There is fierce competition among penguins for nesting sites, especially on the higher well-drained ground -- stealing pebbles from neighboring birds' nests is a favorite pastime.

Scientific name

# Aptenodytes patagonicus

## Miller, 1778

Animalia Chordata Aves Sphenisciformes Spheniscidae Aptenodytes



## Description

Monotypic although subspecies were suggested in the past. In 1911, the amateur ornithologist Gregory Mathews suggested that there were three subspecies of King penguins.

One, *Aptenodytes patagonicus longirostris*, was dismissed but the two others were accepted by James Lee Peters, an American ornithologist who was the curator for birds at the Harvard Museum of Comparative Zoology (Peters 1931). But Peters accepted Mathews's notion that *A. p. patagonicus* was characterised by a ring of blue feathers around the tarsus and occurred at the Falkland Islands and South Georgia. In contrast, the tarsi of *A. p. halli* were supposed to be white at the front and coloured at the back. *A. p. halli* was thought to breed at the Kerguelen, Crozet, Prince Edward, Heard, and Macquarie islands. However, examination of images of King penguins from different locations quickly shows that the vast majority of King penguins at any location has the two-coloured feathering on their tarsi. In 1936, Robert C Murphy also dismissed Mathews's second argument for the division into subspecies, namely that the variations of the colouration in the penguins's flippers were also 'proof' for the existence of subspecies (Murphy 1936). Murphy examined many specimens and found that the variations described by Mathews's commonly occurred in all King penguin populations. In 1960, Bernard Stonehouse also concluded that there were no grounds to postulate sub-species among King penguins (Stonehouse 1960).

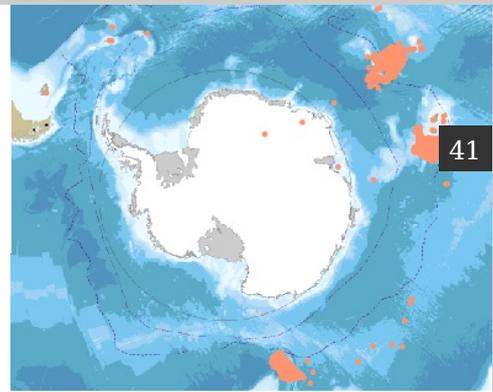
In one of the first genetic studies on King penguins French researchers compared DNA of King penguins from the Crozet and the Kerguelen islands. According to Mathews, these two populations should be very similar. However, the genetic distance between them was relatively high (Viot et al. 1993). This is further evidence that the division into subspecies as suggested in 1911 cannot be upheld.

King penguins are the second largest penguins alive today in terms of size and body weight. The largest penguins are the King penguins's cousins, the emperor penguins. The colouration of male and female King penguins looks alike but males tend to be slightly larger. However, there is much overlap between the genders and a large female can be difficult to distinguish from a small male. Measured from the tip of their beaks to the tip of their tails they are approximately 90 cm long but when they are upright they stand about 65 cm tall. Their necks comprising 13 vertebrae are flexible and highly extendable. When an adult pulls in its head, the cervical vertebrae form a strong S-bend and shorten the appearance of the penguin.

The bodies of King penguins are cigar shaped and streamlined. The flippers are about 32 to 34 cm long and are highly specialised for fast underwater movement. Head, chin, throat and neck are black and contrast strongly with the deep yellow paisley-shaped auricular (ear) patches. The upper part of the chest is also deep yellow but most of the chest and underside of the flippers are a soft white which is demarcated from the dark grey-blue back by a black stripe. The beak is narrow and long with a curved tip. The mandibles are black and the mandibular plates on the lower mandible range in colour from yellow or orange. The feet and legs are black and the iris is dark brown.

The body mass is highly variable throughout the year. When arriving at the colony at the start of the breeding season (October), the penguins weigh around 13 to 15 kg. Unlike their Antarctic cousins, King penguins can go to sea regularly during the chick rearing period since they are not restricted by sea ice. Nevertheless, when feeding chicks the parents have to work hard and it is not uncommon to find adults that weigh only about 9 kg during the chick rearing period.

It takes about 2 to 3 years for a King penguin to acquire its full mature plumage. Juveniles have faint yellow feathers on the chest and the ear patches. Their throats and chins are a soft grey and their beaks are



## Distribution info

King penguins have a circumpolar distribution and breeding colonies are located on the sub-Antarctic islands: Marion, Prince Edward, Crozet, Kerguelen, Heard, Macquarie, South Georgia and the Falkland Islands. Currently a new colony may be in the process of becoming established in Patagonia. The colonies are densely occupied and are located on flat ground or gently rising slopes.

Their at-sea distribution varies with season. As most of the islands occupied by King penguins lay north of the Antarctic Polar Frontal Zone (APFZ), King penguins tend to travel south towards the APFZ during the early breeding season (November to April). In winter, they head even farther south towards the ice-edge of Antarctica.

## Size

The islands and island groups that are home to King penguins are usually occupied by several colonies. King penguins were cruelly slaughtered for their blubber oil in their tens of thousands (possibly hundreds of thousands) in the 19th and early 20th century. Some colonies were nearly driven into extinction. For example, in November 1951, only five King penguins were sighted at Spit Bay, one of them a chick, but in December 1954, no King penguins were seen at Spit Bay (Budd and Downes 1965). Today one of the largest colonies is located at Macquarie Island at Lusitania Bay. Here, only just over 3000 King penguins were left in 1930. The sealers did not keep good records on how many bird they killed and it is impossible to estimate how large the exploited colonies once were. But there were certainly many more in 1810 when the island was discovered than there were in 1930. The killing at Macquarie Island had stopped in 1918; the King penguin numbers started to recover and by 1980 there were an estimated 218 000 birds at Lusitania Bay (Rounsevell and Copson 1982). The largest King penguin population is currently at the Crozet Islands where more than half a million pairs breed. In recent years, King penguins have been seen at a small beach at Terra de Fuego in Argentina. Whether or not they will try to establish a colony there is as yet unknown but the birds are carefully watched by the locals. The size of the global population is difficult to estimate but ranges between 2 and 3 million.

## Habitat

King penguin colonies are located on solid land. Since they incubate their single egg on their feet they prefer the ground to be rather flat and free of large stones. The colonies are often close to the water's edge of the sub-Antarctic islands the penguin occupy but some are several hundred metres away from the coast. To a degree King penguins generate their own breeding space. For example, some narrow, flat coastal areas of Macquarie Island are covered in tussock grass *Poa cookii*. In some places, King penguins established themselves among the tussock which over time became sparse because the plants could not thrive in the nitrogen rich faeces the penguins deposited around them. At Heard Island, the King penguin colonies largely occupy broad valleys away from the coast

## Depth of the distribution

King penguin are exquisite divers and in the bird world second only to Emperor penguins. Maximal dive depths were recorded to 343 m (PÁ/4tz and Cherel 2005) but most of the time King penguins hunt at depths of around 80 to 130 m. Deep dives appear to occur only during daylight hours while night dives tend to be shallow (~ 30-50 m).

## Ecology

King penguins have the longest breeding cycle among penguins. It takes them 14 to 16 months to rear a chick. Hence, a successful pair is unlikely to attempt breeding more than twice in three years. At no time during the year are their colonies void of penguins, ie there are always penguins present. However, their activities vary with time of year. Many breeders gather in the colonies in October/November. They perform extensive courtship behaviours in the search of for a mate. It is common to see King penguins in triads on the beaches where usually two females compete for the same male. Like Emperor penguins, King penguins do not build a nest but they do fiercely defend a small breeding territory inside the colony area. The females lay their single egg any time from November till March. Both parents take part in the incubation of their eggs which weigh usually 230 to 380 g. The eggs are carried on top of the parents' feet and are covered by a skin fold.

Chicks hatch after about 54 d and weigh about 220 g; it takes 2-3 days to get out of the eggs. The chicks are nearly naked when they first leave the egg and entirely dependent upon their parents for warmth and food. For about a month the baby penguins are brooded; both parents share this duty. During brooding, one parent stays with the chick while the other goes out and hunts. When the foraging parent returns, he/she relieves the partner who now goes to sea. The returned parent continues to keep the chick warm and safe and feeds it several times per day.

By April, most chicks have grown up to a point at which they now are able to regulate their own body temperature. They start gathering in creches, kindergardens for penguins. To survive the coming winter they need sufficient body reserves because the parents are largely leaving their offspring in April/May and return only in September/October. A healthy fat chick that weighed about 8 kg in April weighs only about 5 kg when its parents return in the next spring. During the winter, they rarely receive food and gather in large creches to stay warm, as well as seek safety from predatory birds, such as skuas *Catharacta* spp and giant petrels *Macronectus* spp.

Upon their parents return to the colony, the chicks are fed again and quickly put on body mass. They now have to get ready for the moult during which they exchange their soft down for "real" feathers that will enable them to survive at sea.

Since during the moult every single feather is replaced, it costs a lot of energy. Chicks and adults whose body reserves are insufficient cannot survive because as long as the new feathers grow their plumage is no longer waterproof. If they were to go to sea to feed before their plumage is ready, they will get wet and waterlogged and are likely to die. The well-fed penguins stay out of the water for about a month when they moult. They lose about half their body weight but their new feathers are soft and shiny and able to keep the penguins warm and dry for another year.

Scientific name

# Pygoscelis papua (Forster, 1781)

Animalia Chordata Aves Sphenisciformes Spheniscidae Pygoscelis



## Description

Gentoo penguins belong to the pygoscelid or brush tail penguins that also include Chinstrap and Adélie penguins. Males and females look very much alike but females tend to be slightly smaller, particularly with regard to the beak depth and length.

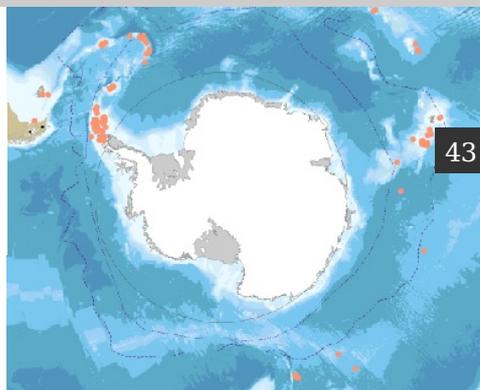
Gentoo penguins stand about 60 cm tall with both feet on the ground and their heads pulled in. The colouration of the sexes is identical; head, throat, back and flippers are dark bluish-black while the chest, belly and underside of the flippers are white. The black and white body parts are clearly separated. Above the eyes are two white patches that often join across the crown. A dusting of white feathers is sprinkled around their head, nape and upper back.

The top of the beaks and their tips are black but the sides are orange to red. The feet are pinkish-orange to red and the irises are brown.

Juveniles can be distinguished from adults only in their first year when the white patches on their heads are discontinuous and the rings around the eyes are still white; some Gentoo penguins appear to retain the white eye rings into adulthood. Juveniles are also often smaller than fully grown adults

As in all penguins, the body mass of Gentoo penguins is highly variable throughout the year. At the beginning of their breeding cycle, these penguins weigh usually 4.8 – 5.7 kg. Post-breeding and prior to the moult they can reach a body mass of more than 8 kg.

Like Chinstrap and Adélie penguins, their tail feathers are much longer compared to other penguin species.



## Distribution info

Gentoo penguins have a circumpolar distribution and their colonies are found at the Antarctic Peninsula and many sub-Antarctic islands. Where they go in the non-breeding period is poorly understood but some adults appear to remain in the vicinity of their colonies all year round. Vagrants were found as far north as 43°S along the Argentine coast and at the coasts of New Zealand and Australia. The largest breeding populations are found at the Falkland Islands and South Georgia.

The at-sea distribution varies throughout the year but Gentoo penguins rarely travel long distances away from their colonies. Their foraging trips usually last only hours rather than days but their duration increases as the chicks grow older and demand more food.

## Size

The global population of Gentoo penguins is estimated to comprise about 314,000 breeding pairs. The size of their colonies varies markedly and they can comprise as little as a dozen nests or more than 2000. The colonies are rather loosely dispersed with inter-nest differences averaging 80-100 cm. Nest site fidelity was very high at South Georgia but less so at King George Island.

The population trends differ with region. While increases in colony size appear to occur in the Antarctic Peninsula region (~ 25% of global population), decreases have been reported from populations in the sub-Antarctic where the remaining 75% of Gentoo penguins live. The decreases also vary with region but the causes for the decreases have so far not been explained. Human disturbance and interactions with commercial fishing operations are major threats.

## Habitat

Gentoo penguins breed in the ice-free areas of sub-Antarctic islands and the Antarctic Peninsula. Most colonies are in near the shores but at South Georgia Island some colonies are located some 2 km inland and about 200 m above sea level. Nests are either built from small stones or are prepared on the cushion plant *Azorella* or tussock (*Poa* spp.). In the sub-Antarctic, Gentoo penguins prefer vegetation as nesting material but in their southern colonies all nests are made of pebbles.

## Depth of the distribution

### Diving

During the breeding season, Gentoo penguins tend to forage inshore within about 30 km of their colonies. But during winter they may go much farther afield; one penguin from the Falkland Islands, for example, travelled to 276 km from the coast. Generally though, they do not move far from their breeding grounds even outside the breeding season.

Gentoo penguins usually forage during the day. Although they can reach maximal depths of about 212 m (recorded in Marion Island in 1981), most of the time they forage at 40-80 m. Dives last on average 1-2 minutes but the longest time spent submerged is an astonishing 677 s recorded in South Georgia in 1989.

## Ecology

The onset of breeding among Gentoo penguins appears to be dependent upon the latitudes of the colonies. Populations south of 50°S start their breeding cycle in spring to early summer (Oct-Nov) while those breeding north of 50°S breed during the winter (Jun-Aug). They lay clutches of two eggs which weigh about 130 g. The duration of the laying period also varies with location; at Crozet Island, laying can last up to 154 days compared to only 41 days at the South Orkney Islands. The two eggs are similar in size and shape although minor difference can exist. Eggs that are lost are usually not replaced.

Gentoo penguins do not necessarily breed every year. Every now and then an individual skips a season, especially when it was unsuccessful in the previous season or when environmental conditions are poor, eg a lot of sea ice is present. However, when they engage in reproductive activities the partners share the incubation duty and change over frequently usually ever 2-3 days. Eggs are laid 3 days apart and are incubated for 32-42 days.

The eggs hatch within one or two days of each other and the chicks are brooded for up to 10 days. Twin chicks appear to be brooded for longer and join the crèches at an older age than single chicks. Chicks are about 25-29 days old when they join a crèche which are often small comprising no more than 10 chicks. Depending on the colony chicks commence their moult at 39 to 85 days of age.

Chicks usually receive less than 2 feeds per day and feeding chases are common once the chicks are old enough to join crèches.

Overall it takes about 80-100 days to rear chicks from hatching to fledging. Breeding success is highly variable among colonies and between years but often only one chick is raised successfully. Nest failure is due to nest desertion, mismatched nest relief, infertility of eggs or predators.

The level of fidelity to a previous mate or nest site varies among years. In years when the return rate to the colony is low, few if any birds retain their previous partners. However, in years when many penguins attempt to breed mate fidelity can be as high as about 90%.

The main predators are skuas, giant petrels, Kelp gulls (*Larus dominicanus*), fur seals and, on some islands, feral cats. Southern elephant seals are occasionally observed to cause havoc among colonies at Macquarie Island.

The diet of Gentoo penguins varies with location, as well as with season. Around the Antarctic Peninsula and South Georgia they mainly consume crustaceans, such as amphipods and Antarctic krill *Euphausia superba* while those at Macquarie Island prefer lantern fish (myctophids) and notothenid fish. At the Kerguelen Islands in the Indian Ocean, Gentoo penguins foraged mainly on fish in winter but on the krill *Euphausia vallentini* in summer.

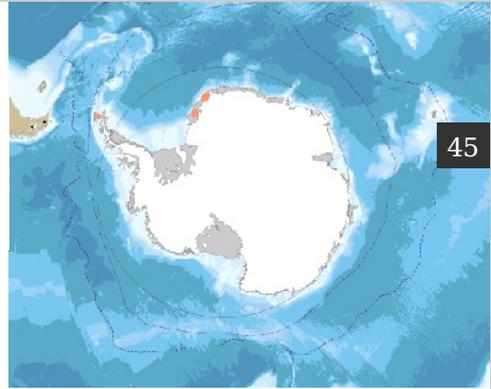
Scientific name

# Synoicum adareanum (Herdman, 1902)

Animalia Chordata Ascidiacea Aplousobranchia Polyclinidae Synoicum

## Description

Orange in colour. This mid-sized squirt can get up to 20cm high and about half this in diameter. It has a round to phallic shaped upper, which feels quite solid to touch. Like in Sycozoa species the clearly visible zooids are arranged circling around the common cloaca. The lower stalk, from which several upper parts may come from, feels much tougher



## Distribution info

15m to deep water, on hard substrates from some Subantarctic islands, throughout the Scotia Arc to the Antarctic Peninsula and Continental Antarctic coastline.

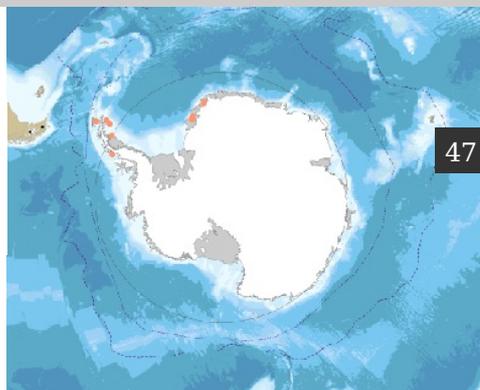
## Ecology

*S. adareanum* is quite conspicuous as orange blobs in mature hard substratum communities. Unlike other colonial ascidians, though like some *Aplidium* species (not shown), they rarely occur as epibionts. The specimen shown is clean but some can be quite sediment strewn and even have particles incorporated into the outer test. Like other ascidians they are suspension feeders filtering phytoplankton. Their predators are unknown to date.

Scientific name

# Cnemidocarpa verrucosa (Lesson, 1830)

Animalia Chordata Ascidiacea Stolidobranchia Styelidae Cnemidocarpa



## Description

Cnemidocarpa verrucosa is probably the most common ascidian (sea squirt) in shallow waters and is fairly featureless – essentially resembling a translucent bag. It varies in colour from brown, through yellow to white and translucent. This species can be highly abundant and can dominate patches many metres in size. It is one of the best known of the Antarctic ascidians. It feeds during summer months and (like most of the benthos) has strongly seasonal reproduction, but unusually larvae are released in winter. Being almost just a “bag” it has very low metabolic rates, even for Antarctic animals

## Distinguishing Characters

large, translucent “bag-like”

## Size

Up to 25cm in diameter and 40cm in height

## Habitat

occurs in most shallow coastal situations from sediment to hard rock

## Depth of the distribution

5m to deep waters

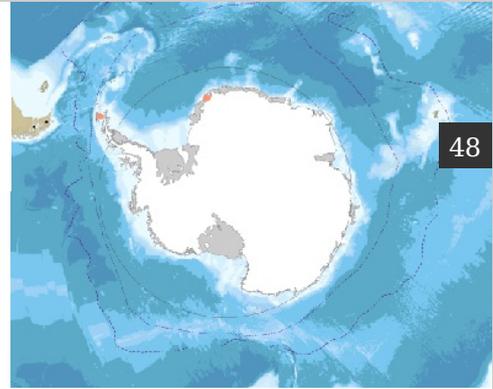
Scientific name

# Pyura setosa (Sluiter, 1905)

Animalia Chordata Ascidiacea Stolidobranchia Pyuridae Pyura

## Description

Small and greyish in colour, with its surface completely covered in flexible bristles, making it look more like a sponge than an ascidian. Pyura setosa grows up to 7.5cm long and smaller individuals may have a short stalk.



## Distribution info

Found below 15m, often on soft substrates, from Sub-Antarctica to the Antarctic Peninsula and Continent.

## Ecology

*Pyura setosa* is a suspension feeder, siphoning through water and filtering out any food material. The bristles probably protect the siphon apertures to some extent. Other organisms such as bryozoans, red algae and other ascidians (recorded examples are *Pyura discoveryi* and *Molgula enodis*) may attach to the surface bristles and grow on large individuals.

Scientific name

# Arctocephalus gazella (Peters, 1875)

Animalia Chordata Mammalia Carnivora Otariidae Arctocephalus

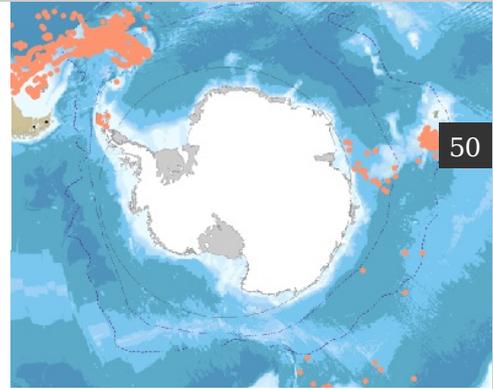


## Description

Antarctic fur seals are one of the most numerous mammalian predators in the Antarctic. The population was hunted to near extinction at the start of the 20th Century for its pelt. It has subsequently recovered with the current population estimated to be in the region of 3-4 million. Around breeding beaches small groups or individuals can often be seen porpoising through the water and will often stop to investigate ships or small boats. On land they are often aggressive and, during the breeding season, large aggregations can make access to beaches difficult.

## Distinguishing Characters

Antarctic fur seals can easily be confused with most of the other fur seal species, their size, coloration and head shape are the easiest characteristics with which to identify them.



## Distribution info

Wide distribution, primarily breeding on sub-Antarctic and Antarctic Islands in the South Atlantic and Indian Ocean regions of the Southern Ocean. 95% of the world population breeds on South Georgia. Non-breeding individuals are more widely dispersed.

## Size

There is large sexual dimorphism with males being up to 1.5 times longer and four times heavier than females. Bullsâ€™ standard length is 180 cm (170-200 cm) weighing 130 kg (90-200). Adult females are on average 130 cm (115-140) in length and around 35 kg (20-50) in weight. Mean weights for new born pups are 5.4 kg for females and 5.9 kg for males with lengths ranging from 58-66 cm.

## Habitat

Fur seals preferentially breed on shale or pebble beaches close to areas of high marine productivity, but in areas of high density they can be found on almost all sea-shore environments. As the breeding season progresses mother-pup pairs usually move into tussock grass areas behind the breeding beaches. Away from the mating season males appear to move southwards foraging around, and hauling out on, the ice edge or Antarctic islands. During winter females disperse at sea ranging from the ice edge to areas far north of the polar front.

## Depth of the distribution

Antarctic fur seals are shallow divers confined to surface waters. Females generally dive to 30-40 m and rarely exceed 200m. Larger males dive deeper ~100m with a maximum recorded of 350 m.

## Ecology

Antarctic fur seals are highly polygynous with territorial bulls defending harems of, on average, nine females. Territories are established on breeding grounds in October to early November, when the musty-smelling males are extremely aggressive in defence of their patch of beach.

Females arrive a few weeks later giving birth a few days after coming ashore. Lactating females then alternate between short trips to sea (2-10 days) and periods ashore (1-2 days) suckling their pups. Pups are weaned at about four months old. Mating takes place a few days after the pup is born and the female gestates for just over a year, so that she is pregnant whilst suckling.

They feed mostly on krill, *Euphausia superba*, in the South Atlantic part of their range with myctophids and nototheniids dominating elsewhere. The predation of squid or penguins may also be locally or seasonally significant. They have few predators although leopard seals and killer whales are known to take smaller individuals particularly juveniles.

Scientific name

# Polyeunoa laevis McIntosh, 1885

Animalia Annelida Polychaeta Aciculata Polynoidae Polyeunoa

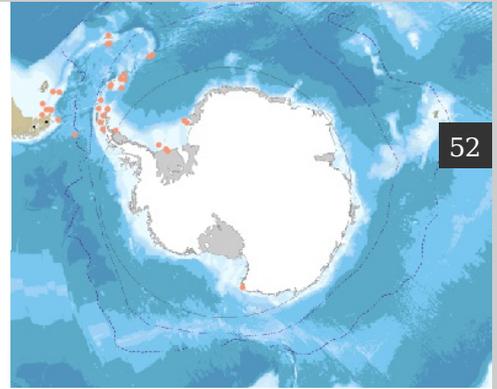


## Description

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## Distinguishing Characters

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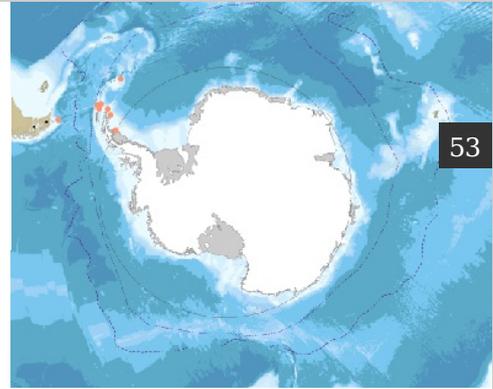
## Distribution info

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Scientific name

# Eulagisca gigantea Monro, 1939

Animalia Annelida Polychaeta Aciculata Polynoidae Eulagisca



## Description

Two of these specimens are gigantic Polynoids. That from Sta. 30 is the largest, and measures 148 mm. by 31 mm. (without the feet) for 37 chaetigers. The other large specimen is from Sta. 107, and measures 110 mm. by 20 mm. (without the feet) for 37 chaetigers. The third specimen is much smaller, and measures only 60 mm. by 12 mm. (without the feet), also for 37 chaetigers. There are 15 pairs of elytra arranged as in *Harmothoë*. Except for traces of brown transverse bands upon the back there is little colour in spirit. The bristles are conspicuously golden. Purplish-brown markings are discernible on the head except in the largest specimen. The head (fig. 4a) is roughly cordiform, and there are two pairs of almost contiguous eyes at the outermost edges of the prostomium. The lateral tentacles are inserted terminally, and there are no peaks. Most of the tentacles, etc., are lost, and the following account is a reconstruction from the three specimens.

The palps are very long, reaching back to the tenth chaetiger. They are papillated, but the papillae, instead of being diffuse, are arranged in six rows of two or three lines of papillae. The median tentacle is lost. Below the median tentaculophore there is a subtentacular cirrus about half the length of the head. The lateral tentacles are about half as long as the tentacular cirri, which they otherwise resemble. They are papillated, and have a subterminal enlargement and a filiform tip. At the base of the tentacular cirri there are an aciculum and a few bristles. At the back of the head there is a conical fleshy nuchal pad extending almost to the level of the hinder pair of eyes. Behind this pad there is an occipital flap or gibbosity.

The elytra have become detached, and those belonging to the smallest specimen are lost. Those belonging to the largest example (fig. 4b) are huge, leathery, reniform structures, measuring about 30 mm. by 21 mm. at the widest part. They are flesh-coloured, with the border opposite the hilum pigmented dark brown. Near the hilum they are thickly covered with small tubercles, but the rest of the scale has a dense covering of longer and shorter spines (fig. 4e) resembling those of *Harmothoë crosotensis*, interspersed with rather soft ovate vesicles. Both spines and vesicles are largest near the border opposite the hilum (fig. 4d). The elytra of the second of the large specimens are relatively considerably smaller, and are splashed with brown markings. They differ from those of the largest specimen in that the ovate vesicles are absent and are replaced by a relatively small number of gigantic tubercles surmounted by clusters of long spines (fig. 4e).

The elytriphores are prominent, and pseudo-elytriphores are present. The dorsal cirri are set low down on the feet, and the cirrophores have a prominent lateral expansion. The dorsal cirri are lost in all except the smallest specimen, and in this they are hirsute, and reach to the end of the ventral bristles. The ventral cirri reach to the end of the foot.

The feet (fig. 4f) resemble those of *Eulagisca corrientis* (see Monro, 1930, fig. 11b). The dorsal ramus sends out a long sheathed aciculum behind and below the dorsal bristle bundle. The ventral ramus has a longer sheathed aciculum in front of the ventral bristle bundle.

The dorsal bristles (fig. 4g) are very numerous, almost as long as the ventral, rather slender and pectinated. The ventral bristles (fig. 4h) are more numerous and finer than the dorsal. They have frills extending over about a quarter of their length, and a rather long and delicate unidentate naked tip. The anus is terminal.

This species is close to the type-species, *E. corrientis* McIntosh, but differs chiefly in the ornamentation of the elytra. The elytra of *E. corrientis* are smooth. McIntosh described them as comparatively smooth over the greater part of the area, and having a few clavate cilia at the posterior border. Of the Discovery Committee's material a specimen from the Palmer Archipelago has a few elytra, and these agree with McIntosh's account, except that I see no cilia. Moreover, I suspect that the specimens attributed to McIntosh's species by Benham (1921, 43) may belong to the present species. Benham, in describing one of the second pair of scales, writes, "there are three large, broad, round-tipped conical tubercles near the external margin, and springing from the surface of the scale between them, but nearer to the margin are a few long, fine, cylindrical hair-like papillae. The concealed portion of the

elytron bears numerous small, rounded, low, and highly refringent tubercles, only visible under a high magnification. There is no fringe."

At any rate the elytra in Benham's specimens were not smooth as in *E. corrientis*. Benham's account of the elytra is not in close agreement with those of my specimens, but that the ornamentation is variable is shown by the differences between the elytra of the two larger specimens already noted.â€

(Monro, 1939)

## Distinguishing Characters

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