

LOW LIFE

In the icy waters around Antarctica, phytoplankton are the first vital link in the food chain. Many other Antarctic animals depend on this rich food source to survive. Krill, which may be the most important of the Antarctic LOW LIFE, feed on the tiny phytoplankton.

Phytoplankton are tiny plants that live in all the world's oceans and lakes. They are so small that they can only be seen with a microscope. Scientists have counted as many as a million tiny phytoplankton in just one litre of seawater. During spring and summer they multiply rapidly, turning parts of the ocean into a thick-looking pea soup! They make their own food by using sunlight to convert water and carbon dioxide into sugar in a process called photosynthesis. They may be LOW LIFE but all other life in the ocean depends on them.

Diatoms are the most common phytoplankton in the Southern Ocean. They have hard shells and are very beautiful when seen at high magnification under a special microscope.



Krill *Euphausia superba*

The most important of the Antarctic LOW LIFE are the small shrimp-like creatures called krill. They grow up to 6 centimetres long and swim together in huge swarms, hundreds of metres across and 15 to 20 metres deep. The total number of krill in the Southern Ocean is estimated to be 150 million million! Krill feed mainly on the tiny phytoplankton that they trap using fine hairs on their front legs. But they also occasionally eat other krill. In turn the krill are eaten by just about every other animal in the Antarctic food chain including the giant baleen whales, seals, fish, penguins and many other seabirds. Although they are low down in the 'snacking-order' they are the centrepiece of the entire Antarctic food chain.

NETTING KRILL

Fishing for krill is now a major industry and trawlers can net between 8 and 12 tonnes in an hour – that's up to 12 million of the tiny creatures. Overfishing of krill would be a real threat to the balance of life in Antarctica. Australian scientists use echo sounders to calculate the distribution and abundance of krill in the Southern Ocean. This information is used to manage the krill fishery in a way that allows for the needs of all the animals, big and small.



SILENT KILLER?

The ozone layer is a very important part of the Earth's atmosphere. It is found about 15-30 kilometres above the surface of the Earth and acts as a powerful shield against the Sun's harmful UV radiation. In 1985, scientists discovered a hole in the ozone layer above Antarctica. Since then it has grown at an alarming rate and is now four times the size of Australia and still growing. Certain chemicals called CFCs that were used in spray cans were found to be causing most of the damage. All living things are easily injured by UV radiation. It can cause sunburn, skin cancers and other health problems in humans. Scientists working in Antarctica have shown that increased UV radiation kills phytoplankton and reduces the life expectancy of krill.

Any further increase in UV in the Antarctic will have unknown effects.



If you could see inside an Adélie penguin's stomach after a feeding trip at sea you would see hundreds of mushy krill.



SIZING UP THE SUSPECTS

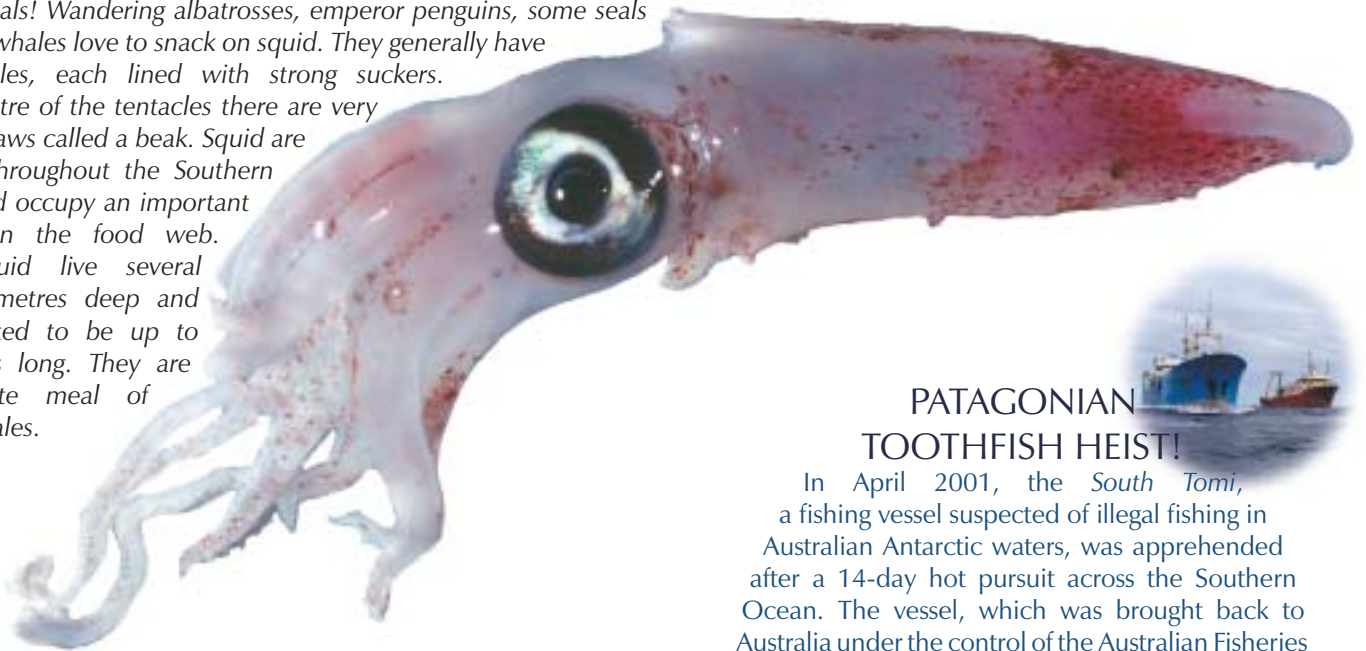
Some Things Fishy

There are about 120 fish species known to live in Antarctic waters. They show some remarkable adaptations to their environment, including proteins in their blood that act as antifreeze to help them survive in the icy waters. The 'antifreeze' lowers the freezing point of their body fluids to about minus 2°C and stops them freezing, even when water temperatures are below zero.



Antarctic ice fish have colourless blood and have a ghostly white appearance.

Squid are fast, cunning, have a very healthy appetite and excellent eyesight. They swim using a form of jet propulsion. There are thought to be about 20 different types of squid in the Southern Ocean. They feed on small fish and small crustaceans, especially krill. And some species are cannibals! Wandering albatrosses, emperor penguins, some seals and most whales love to snack on squid. They generally have 10 tentacles, each lined with strong suckers. At the centre of the tentacles there are very powerful jaws called a beak. Squid are plentiful throughout the Southern Ocean and occupy an important position in the food web. Giant squid live several hundred metres deep and are reported to be up to 18 metres long. They are a favourite meal of sperm whales.



The **Patagonian toothfish** *Dissostichus eleginoides* is one of the most remarkable fish species in the world. It lives anywhere between 300 to 2500 metres below the surface, under incredible pressure and in almost total darkness. Patagonian toothfish grow slowly and reach spawning age after 10 to 12 years, at which stage they are about 70 centimetres long. They can live for 50 years and grow to over 2 metres and weigh more than 120 kilograms.

Scientists can calculate the age of a toothfish by counting the growth rings on the fish's ear bones. They mostly eat smaller fish, squid, krill and plankton.



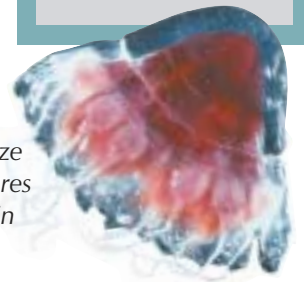
SIZING UP THE SUSPECTS



Starfish are some of the most colourful **LOWLIFE** in Antarctic waters.

Low Life MENU
Phytoplankton
focaccia
Krill crackers
Squid soup

Jellyfish can vary in size from 0.5 to 50 centimetres and are very common in Antarctic waters.



PATAGONIAN TOOTHFISH HEIST!

In April 2001, the *South Tomi*, a fishing vessel suspected of illegal fishing in Australian Antarctic waters, was apprehended after a 14-day hot pursuit across the Southern Ocean. The vessel, which was brought back to Australia under the control of the Australian Fisheries Management Authority, was carrying a haul of Patagonian toothfish worth about \$1.5 million. The Patagonian toothfish story is one of looming environmental tragedy. Scientists believe that if illegal fishing continues at the current rate, the whole fishery may collapse within five years.

WHO'S EATING WHO?

