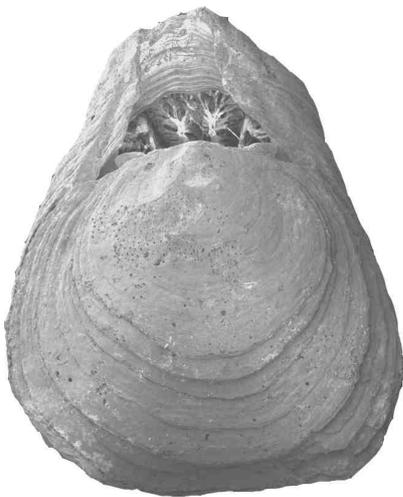


# Antique Lamp Shell

*Pumilus antiquatus*

## Ancient survivor



*Pumilus antiquatus*, inferior valve view. Scanning Electron Microscope photo courtesy Jeffrey

## Quickfacts

A member of an ancient type of marine shelled invertebrate.

Currently only known from Lyttelton, Karitane and Otago Peninsula.

Vulnerable to changes in its marine environment, particularly pollution and ocean acidification.

Need to search for this species in other coastal areas.

## Poorly known coastal denizen

Lamp shells look a little like small, delicate-shelled cockles, but they are not molluscs. They belong in a group of animals all by themselves: the brachiopods. If you look carefully, rather than having a shell with two identical halves that fit together like cockle shells, a brachiopod has differently-shaped shells (correctly termed valves). The larger shell has a beak at one end with a hole or foramen in it. This is the hole through which a stalk, also called a pedicle, comes out of the shell and attaches it to the sea floor or the rocks on which it lives.

Lamp shells are exclusively marine, and often live together in diverse ecosystems with sponges, lace corals and soft corals. They are filter feeders that feed on plankton - tiny plants and animals that float in the water column. The inside of the lamp shell contains a feeding and breathing structure called a lophophore. The lophophore is a hollow tube tipped at one end with a ring of tentacles surrounding a mouth. As brachiopods are fixed in one place, they feed by beating the hair-like cells (cilia) on the tentacles together to cause a tiny current that pulls plankton towards the mouth. The different species



of brachiopod are identified from their different shell shapes and by the shapes of their lophophores and its supporting skeleton (the calcitic loop).

Brachiopods are studied all around the world, but are mostly known to scientists as fossils that are useful for dating the age of sedimentary rocks. During the Paleozoic (the geological era that was 540-252 million years ago) lamp shells dominated the warm shallow seas (and occupied other habitats), but since then they have been largely replaced by molluscs and other animals. New Zealand is, however, a hotspot for living brachiopods. New Zealand has over 500 fossil species of lamp shell and 38 species that are still alive.

The antique lamp shell *Pumilus antiquatus* is a small brachiopod that was first scientifically described in 1958 by Dr D. Atkins from the Plymouth Marine Laboratory in the UK. She described it initially from a specimen attached to some rocks from Lyttelton Harbour sent to her by Edward Percival, a professor of biology and zoology at Canterbury University between 1929 and 1959. Later, she received more specimens and, after looking at over 100, she described and named the species.

*Pumilus antiquatus* is a small dark brown brachiopod, with the greatest shell length being 4.7mm. Atkins described them as having “well marked growth lines” and “a generally aged appearance.” Because of their small size and old looking shell, Atkins gave this brachiopod the genus name *Pumilus*, which is Latin for dwarf, and *antiquatus*, the Latin for aged or old.

*Pumilus antiquatus* lives on the sea shore, on rocks or boulders, below the low-tide mark. It is an articulated brachiopod, which means that the two halves of the shell are hinged together by a tooth and socket arrangement. It is a hermaphrodite and has both male and female sex organs within its body and reaches sexual maturity when it is still quite small. Gametes, the eggs and sperm, are released into the water in late May to early June, where fertilisation occurs. It is thought that the eggs and sperm mature at the same time and it produces relatively few eggs.

*Pumilus antiquatus* is endemic, and are known currently from only three areas in the South Island: Lyttelton Harbour on Banks Peninsula, near Karitane, and around Portobello and Quarantine Island in the Otago Harbour. This does not, however, mean that it may not be found in other places as there are few brachiopod experts or people searching for marine invertebrates and therefore the animal may be overlooked - prior to 1960 *Pumilus antiquatus* was only known in one pool in Lyttelton Harbour before being discovered in Otago Harbour in 1964! As they are so small too, they can be mistaken for the young of the brachiopod *Calloria inconspicua*, which is a more common brachiopod that lives in the same habitats, but which is bright red in colour and more circular in shape.

Because they are so poorly known, there are no conservation plans dedicated to

*Pumilus antiquatus*. More research on similar rocky shore habitats may well expand their known range.

All marine animals are vulnerable to pollution and ocean acidification and shelled animals are especially vulnerable to changes in the acidity of their surrounding water. Ocean acidification is caused by the uptake of excess carbon dioxide by the ocean, which makes the seawater slightly more acidic and brachiopod shells are made from calcium carbonate that dissolves in acid. Harbour waters, such as those in which *Pumilus antiquatus* is found, can be more polluted than open water due to runoff from the surrounding land not being moved away by currents or waves. Water also stays in harbours for a while, mixing slowly with new water from the ocean, so pollutants can build up. *Pumilus antiquatus* used to be abundant in Otago Harbour but is now rare, possibly as a result of water pollution. Any conservation actions that reduce pollution and carbon dioxide in the atmosphere and the land surrounding the harbours will help protect not only our unique brachiopods, but all marine animals.

## What next?

The main conservation action required for *Pumilus antiquatus* is to see if it can be found in waters elsewhere such as around Stewart Island, or in the Marlborough Sounds and Wellington Harbour. This will require searching by an expert and is likely to cost around \$300,000. Or are there any keen snorkellers or divers out there?

## More information

Scientific paper: Phylum Brachiopoda, lamp shells by MacFarlan, D. A. B., Bradshaw, M. A., Campbell, H. J., Cooper, R. A. Lee, D. E., MacKinnon, D. I., Waterhouse, J. B., Wright, A. J. & Robinson, J. H. In: Gordon, D. Editor. New Zealand Inventory of Biodiversity, Volume One, Kingdom Animalia, Radiata, Lophotrochozoa, Deuterostomia. Canterbury University Press, Christchurch, New Zealand, pages 255-267, 2009.

Scientific paper: A guide to New Zealand's recent brachiopods. By Zeddie Paul Bowen. Tuatara 16, pages 127-150, 1968. [Link](#)

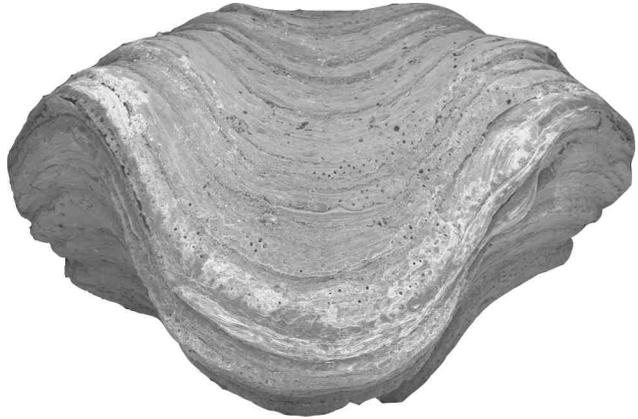
Scientific paper: A new species and genus of Kraussinidae (Brachiopoda) with a note on feeding. By D. Atkins. Journal of Zoology, vol. 131, pages 559-581, 1958. [PDF](#)



## Photos



*Pumilus antiquatus*, lateral view. Scanning Electron  
Microscope photo courtesy Jeffrey Robinson



*Pumilus antiquatus*, anterior view. Scanning  
Electron Microscope photo courtesy Jeffrey

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