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Lineage – Scientific methodology

Annual distribution of the dwarf white lamp shell *Pumilus antiquatus* lineage

Pumilus antiquatus Atkins, 1958 is a tiny brachiopod (lamp shell) obtainable intertidally, usually under boulders but also in rock pools and *Macrocystis* holdfasts at intertidal localities on sheltered rocky shores in Lyttelton and Otago Harbours. The shell is white but the periostracum can become darker through iron-staining, or the gonads may impart a pinkish tinge through the transparent shell. Owing to its small size the species is easily overlooked or mistaken as the juvenile of some other species (typically *Calloria inconspicua*)—so it may have a wider distribution than has been reported. Notwithstanding, studious searching by Rickwood (1968) around Rangitoto Island, Auckland, along the South Island west coast from Karamea to Jackson's Bay, the exposed coast between Banks and Otago Peninsulas, and Half Moon Bay, Stewart Island turned up no records. The largest specimen recorded is only 5.7 mm shell length. *Pumilus* is one of only three endemic New Zealand brachiopod genera and has only the one species. It is simultaneously hermaphroditic in the breeding season, larvae are brooded within the shell, and the life span is about three years.

This little brachiopod is probably seriously at risk. In searches during the past 15 years, very few specimens have been found at the historically rich localities (D. Lee, pers. comm.).

1. Literature

All relevant information pertaining to the species is given in the papers by Atkins (1958), Bowen (1968), Rickwood (1968), and Dawson (1971). Searches were therefore not initiated on any reference database.

2. Museum holdings

Three specimens are held by the Natural History Museum, London: the lectotype (ZB1620), paralectotype (ZB1621), and paratype (ZB1622). These specimens are figured in Atkins (1958). Other specimens are lodged in the collections of the Department of Geology, University of Otago, and Department of Geosciences, University of Canterbury.

Examination of the NIWA Invertebrate Collection database **Specify**, and consultation with relevant experts in May 2009 revealed no new records of *Pumilus antiquatus*.

3. Summary

Pumilus antiquatus is a habitat-restricted species of an endemic genus of Brachiopoda (Kraussinidae) that is known only from intertidal environments in Lyttelton and Otago Harbours. All information pertaining to the distribution of this species is referenced below.

The above information on the distribution of this brachiopod was written by Dennis P. Gordon, NIWA, Wellington, and reviewed by Dr Daphne E. Lee (University of Otago). Not enough is known of the distribution of this species to allow hotspots or the 90% distribution to be shown. However, its typical sheltered, intertidal rock habitat is easily searched and so the Known not to exist distribution layer can be defined with some confidence. The 100%, Known not to exist, and Unknown distributions were integrated by hand onto a large-scale map of New Zealand. The rounded lines were digitised and imported into a GIS software package as layers. The area of each distribution class was calculated and the layers linked to attribute and metadata files.

No additional records of the species outside of the known range were identified in reviews carried out in November 2007 and May 2009.

4. References

The following publications are the key references and/or the ones most useful in describing the recent/current annual distribution of this brachiopod species and genus.

Atkins, D. (1958). A new species and genus of Kraussinidae (Brachiopoda) with a note on feeding. *Proceedings of the Zoological Society, London* 131: 559–581, 1 pl.

Bowen, Z.P. (1968). A guide to New Zealand Recent brachiopods. *Tuatara* 16: 127–150.

Dawson, E.W. (1971). A reference list and bibliography of the Recent Brachiopoda of New Zealand. *Journal of the Royal Society of New Zealand* 1: 159–174.

Rickwood, A.E. (1968). A contribution to the life history and biology of the brachiopod *Pumilus antiquatus* Atkins. *Transactions of the Royal Society of New Zealand, Zoology* 10: 163–182.