



Lineage – Scientific methodology

Annual distribution of the giant seep mussel *Bathymodiolus tangaroa* lineage

Bathymodiolus tangaroa Cosel and Marshall, 2003 is a large, endemic mytilid bivalve known from only two localities off the east coast of the North Island. Shells measuring 10 cm to almost 20 cm in length were collected from 1170 m on the South Ritchie Bank and between 920 and 1205 m in the Madden Basin, respectively southeast and south of Cape Kidnappers. The biotope is hard-bottom areas of continental margin where plumes of sonar-reflective water, presumably rich in hydrocarbons, rise from the seabed (Lewis & Marshall 1996). Presumably the mussels live at these emission sites and are nourished by methane-metabolising symbiotic bacteria concentrated in their enlarged gills.

Further species of deep-sea mussels (including other *Bathymodiolus* species) from New Zealand waters await description (B.A. Marshall, Museum of New Zealand Te Papa Tongarewa, pers. comm.).

1. Literature

All relevant information pertaining to the species is given in the papers by Lewis and Marshall (1996) and Cosel and Marshall (2003). Searches were therefore not initiated on any reference database.

2. Museum holdings

The holotype and 8 paratype specimens (shell pairs) are held by Museum of New Zealand Te Papa Tongarewa in the natural history collection. The following species summary is derived from this source.

Examination of the NIWA Invertebrate Collection database **Specify**, and consultation with B.A. Marshall, revealed two additional records of *Bathymodiolus tangaroa* collected in March 2007 and formally identified in April 2008. These were from within the known distribution for the species but extend the depth range slightly shallower, to 908 m.

3. Summary

Bathymodiolus tangaroa is a range-restricted species in a genus of mussel (Mytilidae) that is typically found in cold-seep environments. It is known from only two localities, off eastern North Island at 920–1205 m depth (referenced below).

The above information on the distribution of this mussel was written by Dennis P. Gordon, NIWA, Wellington, and reviewed by Bruce A. Marshall (Museum of New Zealand Te Papa Tongarewa). Too little is known of the distribution of this species to allow hotspots or the 90% distribution to be shown, but because the biotope in which this species is found is well circumscribed, the categories Unknown and Known not to exist can be distinguished 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, although the latter review extends the depth range into slightly shallower waters.

4. References

- Cosel, R. von; Marshall, B.A. (2003). Two new species of large mussels (Bivalvia: Mytilidae) from active submarine volcanoes and a cold seep off the eastern North Island of New Zealand, with description of a new genus. *The Nautilus* 117: 31–46.
- Lewis, K.B.; Marshall, B.A. (1996). Seep faunas and other indicators of methane-rich dewatering on New Zealand convergent margins. *New Zealand Journal of Geology and Geophysics* 39: 181–200.
- Smith, P.J.; McVeagh, S.M.; Won, Y.; Vrijenhoek, R.C. (2004). Genetic heterogeneity among New Zealand species of hydrothermal vent mussels (Mytilidae: *Bathymodiolus*.) *Marine Biology* 144: 537–545.