



Lineage

Annual Distribution of the Radiate Limpet

1. Literature sources were searched for information on distribution. This limpet has been known as *Cellana radians* since 1973 (Powell 1973). Powell's (1979, page 43) "perana form", from the South and Stewart Islands, is possibly a different species (B. Marshall, Museum of New Zealand Te Papa Tongarewa, pers. comm.), but was not separately addressed.
 - a. General texts on the ecology of the New Zealand seashore were reviewed for distributional information. These indicated that *C. radians* lives on rocky shores around the North, South, and Stewart Islands, mainly in more sheltered but also in exposed situations.
 - b. Using the keywords **cellana radians** or **c. radians**, extracts were made from Aquatic Sciences and Fisheries Abstracts (all records at 27 July 2003). Using the keywords **cellana** or **c. radians**, extracts were made from NIWAcat (all records, as at 27 July 2003). Relevant publications were obtained and used to help estimate recent and current distributions.
 - c. Using **cellana radians**, a Google search was conducted on 15 August 2003. Relevant publications were obtained and used to help estimate recent and current distributions.
 - d. Using subject indices for 1986–2002, *Seafood New Zealand* was checked for articles dealing with limpet distribution and research, of which none were located.
 - e. *New Zealand Fishing News*, 1998–2002 inclusive, was checked for articles dealing with limpets to help estimate presence/absence, of which there were none.
 - f. Using the keywords (anywhere or global) **limpet and thesis** or **cellana and thesis** (University of Auckland, Auckland University of Technology), **limpet or cellana and thesis** (Waikato University, University of Otago), **limpet and thesis**, and **cellana and thesis** (Massey University, Victoria University of Wellington, University of Canterbury), library catalogues were checked between 7 July and 12 August 2003, with relevant theses obtained and examined.
2. Museum holdings.

Holdings of *C. radians* at NIWA and Te Papa were examined. Other museum holdings were not investigated because it was considered that they would not add anything to the record. Data were used to help estimate presence/absence beyond North, South, and Stewart Islands.

- a. NIWA Greta Point. The **AllSeaBio** database was examined for records on 23 July 2003, with no specimens recorded. Additions made to the collection since about 1995 have not been loaded onto this database; in a search on 22 August 2003, no specimens of *C. radians*, identified to species level and shelved, were found.
 - b. Museum of New Zealand Te Papa Tongarewa (**Te Kahui**) records of this species based on voucher specimens held in their collection were not available for examination. However, this layer was certified by Bruce Marshall, Collection Manager of Molluscs, Museum of New Zealand Te Papa Tongarewa.
3. Ministry for Primary Industries electronic databases were not examined because in none are limpets recorded to species level. Note that LIM is not specific to *C. radians* but is a generic code for all limpet species. Iwi were not consulted because there was no evidence that the species of patellid limpets were distinguished by Maori (Strickland 1990).
 4. Summary.

Cellana radians is an endemic intertidal species, adults of which are found around the North, South, and Stewart Islands in both sheltered and exposed rocky shores (Morton & Miller 1968, Powell 1979, Dickie 1982, Walsby & Morton 1982, Cometti & Morton 1985). radiate limpets reach maturity at about 20 mm shell length, at least in Northland, and the juvenile and adult habitats are essentially the same (Creese & Ballantine 1983). Because this is a benthic species that moves little, the seasonal distributions are the same as this annual one.

The scarcity of detailed abundance and distribution data mean that hotspots of distribution are poorly defined. The 90% and 100% distributions as presently determined essentially overlap. Because of the conspicuous intertidal habitat of this species, its absence from the Chatham Islands and the subantarctic islands is confirmed. Its presence at other offshore islands around mainland New Zealand and Stewart Island is assumed, although for example Schiel (1984) did not report it among the commonly encountered organisms in the benthic sampling programme at the Poor Knights Islands. On the other hand, it has been reported from the Three Kings Islands (Anon 1967).

The above information on the distribution of *C. radians*, derived mostly from general accounts in the literature, was provided to an expert scientist who integrated this information with their expert opinion to produce hand-drawn distributional zones hand onto a large-scale map of New Zealand. Rocky shores, the habitat of this species, were distinguished from sand and mud shores, at a scale consistent with the scale of the template map. The rounded lines were then digitised and imported into a GIS software package as layers. The areas of each distribution class were calculated and the layers were linked to attribute and metadata files. The map, because of its scale, cannot be taken to accurately define the local

distribution of this species. For example, the distribution line does not go into complex water systems such as the Marlborough Sounds and Fiordland, yet the radiate limpet does, but not as far as the most sheltered inner areas.

5. References.

The following publications were the key references and/or the ones most useful in describing the recent/current annual distribution of the radiate limpet *C. radians*. The list is not intended to be an exhaustive bibliography of publications about this species.

Anon (1967). *Cellana radians* (Gmelin). *Poirieria* 4(1): 12-13.

Cometti, R.; Morton, J. (1985). Margins of the sea. Exploring New Zealand's coastline. Hodder & Stoughton, Auckland.

Creese, R.G.; Ballantine, W.J. (1983). An assessment of breeding in the intertidal limpet, *Cellana radians* (Gmelin). *Journal of Experimental Marine Biology and Ecology* 67: 43-59.

Dickie, B.N. (1982). Aspects of the ecology of three species of *Cellana* in the Wellington area. Unpublished MSc (Hons) thesis, Victoria University of Wellington.

Morton, J.; Miller, M. (1968). The New Zealand sea shore. Collins Auckland.

Powell, A.W.B. (1973). The patellid limpets of the world (Patellidae). *Indo-Pacific Mollusca* 3: 75-206.

Powell, A.W.B. (1979). New Zealand mollusca. Marine, land and freshwater shells. Collins Auckland.

Schiel, D.R. (1984). Poor Knights Islands marine reserve survey. *Leigh Laboratory Bulletin* 15.

Strickland, R.R. (1990). Nga tini a Tangaroa, a Maori-English, English-Maori dictionary of fish names. *New Zealand Fisheries Occasional Publication* 5.

Walsby, J.; Morton, J. (1982). Cape Rodney to Okakari Point Marine Reserve marine molluscs. Part 1. Chitons, limpets & topshells & pulmonates. *Leigh Laboratory Bulletin* 4.

2007 Update.

A Google search (***Cellana radians***) on 7 September 2007, and searches of Seafood New Zealand (September 2005 to August 2007) and New Zealand

Fishing News for 2006, did not yield any information that extended or altered the above distributions.

An examination on 17 September 2007 of the **specify** database of the NIWA National Invertebrate Collection for any new (post-July 2005) collections and any new (post-July 2005) identifications of old material did not lead to any extension or change to the distribution map. Similarly, there have been no further, formally identified shelvings of material in the Te Papa collections that extended or altered the distribution (Bruce Marshall, Curator of Molluscs, Museum of New Zealand Te Papa Tongarewa, pers. comm.).

The above was discussed with Bruce Marshall on 18 September 2007, and it was agreed that the current distribution map remains the best understanding of the distribution of this species. Note, however, that because of its scale, the distribution map cannot be taken to accurately define the local distribution of this species.

2010 Update.

A Google search (***Cellana radians***) on 6 September 2010, and searches of Seafood New Zealand (September 2007 to September 2010) and New Zealand Fishing News (October 2009 to October 2010), did not yield any information that extended or altered the above distributions.

An examination on 12 September 2010 of the **specify** database of the NIWA National Invertebrate Collection for any new (post-August 2007) collections and any new (post-August 2007) identifications of old material did not lead to any extension or change to the distribution map. Note, however, that because of its scale, the distribution map cannot be taken to accurately define the local distribution of this species.

2012 Update.

A Google search (***Cellana radians***) on 9 August 2012 did not yield any information that extended or altered the above distributions.

An examination on 3 August 2012 of the **specify** database of the NIWA National Invertebrate Collection for any new (post-June 2010) collections and any new (post-June 2010) identifications of old material did not lead to any extension or change to the distribution map. Note, however, that because of its scale, the distribution map cannot be taken to accurately define the local distribution of this species.