



Annual distribution of *Gigartina alveata* lineage

The red seaweed *Gigartina alveata* (Turner) J.Agardh is endemic to New Zealand and is found intertidally around the northern North Island (Adams 1994).

1. Literature sources

The literature was searched for distributional information for the red seaweed *G. alveata*.

- a. A search was carried out of the following databases: Te Puna using the keywords "*Gigartina alveata* + Zealand +geograph? (+distribut?)" Keyword Relevance Search = "*Gigartina alveata* +thesis (16/09/2005); Aquatic Sciences and Fisheries Abstracts "*Gigartina alveata* and zealand and (geograph* or distribut*)" (16/09/2005); Web of Science "TS = (*Gigartina alveata* and zealand and (geograph* or distribut*))" (15/09/2005); Scopus "title-abs-key ("*Gigartina alveata*" and zealand and (geograph* or distribut*))" (16/09/2005); Google Scholar "zealand geographic or distributed or distribution '*Gigartina alveata*'" (19/09/2005). From all these sources 10 paper citations were located (ASFA = 1; Google scholar = 9).
- b. Using subject indices, *Seafood New Zealand* was checked for articles dealing with *Gigartina alveata* and research.
- c. A search of NIWACAT in September 2005 provided additional records that contributed distribution information for this species.

2. Ministry of Fisheries electronic databases

There are no data held for *G. alveata* in the Ministry of Fisheries databases.

3. Museum holdings

Holdings of *G. alveata* were examined at WELT (herbarium of the Museum of New Zealand Te Papa Tongarewa), AK (Auckland Museum herbarium, including the herbarium of Auckland University), and in the algal research collections at NIWA. Data were used to help estimate presence/absence.

4. Summary

The purplish black thalli of *G. alveata* form a distinct zone in the upper to mid intertidal zone of open coasts (0–2 m depth relative to high water, depending on location) of the northern North Island. Francis & Grace (1986) noted that it tolerates a medium degree of wave exposure. This species extends to Kiritohere on the west coast (south of Raglan) and to

Tolaga Bay on the east coast. It is not found on the Three Kings Islands. This endemic species was one of the first macroalgae to be scientifically described and named from New Zealand. The type material was collected by Joseph Banks on Cook's first voyage to New Zealand (1769–1770).

As a member of the family Gigartinaceae, this species contains the cell wall carbohydrate carrageenan. There is considerable commercial interest in the properties of this group of polysaccharide compounds (Parsons et al. 1977, Falshaw & Furneaux 1995, Hurd et al. 2004). Recent research on the relationships of species within the Gigartinaceae suggests that *G. alveata* is representative of an undescribed monotypic genus that is resolved as a basal lineage in the family (Hommersand et al. 1999).

The 90% distribution has been overlaid on the 100% distribution and has been extended to link headlands or subtidal reef areas where this species has been recorded and/or where equivalent habitats occur.

The above information on the distribution of *G. alveata* derived primarily from herbarium collections, was reviewed by Dr Murray Parsons, former Keeper Landcare Herbarium, and then integrated by hand onto a large-scale map of New Zealand. 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.

5. References

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

- Adams, N.M. (1994). Seaweeds of New Zealand. Canterbury University Press. 360 p.
- Falshaw, R.; Furneaux, R.H. (1995). Carrageenans from the tetrasporic stages of *Gigartina clavifera* and *Gigartina alveata* (Gigartinaceae, Rhodophyta). *Carbohydrate Research* 276: 155–165.
- Francis, M.P.; Grace, R.V. (1986). Marine algal survey of northeastern Great Barrier. *Journal of the Royal Society of New Zealand* 16: 335–346.
- Hommersand, M. H.; Fredericq, S.; Hughey, J. (1999). Recent developments in the systematics of the Gigartinaceae (Gigartinales, Rhodophyta) based on *rbcL* sequence analysis and morphological evidence. *Phycological Research* 47: 139–51.
- Hurd, C.L.; Nelson, W.A.; Falshaw, R.; Neill, K. (2004). History, current status and future of marine macroalgae research in New Zealand: taxonomy, ecology, physiology and human uses. *Phycological Research* 52: 80–106.

Parsons, M.J.; Pickmere, S.E.; Bailey, R.W. (1977). Carrageenan composition in New Zealand species of *Gigartina* (Rhodophyta): geographic variation and interspecific differences. *New Zealand Journal of Botany* 15: 589–595.