Lineage – Scientific methodology

Annual distribution of the medusiform sea daisy *Xyloplax medusiformis* lineage

Xyloplax medusiformis Baker, Rowe & Clark, 1986 is a small, deepwater endemic echinoderm associated with sunken waterlogged timber. *X. medusiformis* is known so far from only two localities, off Castlepoint and Hokitika, at depths possibly as shallow as 1103 m and as deep as 1208 m. Nine specimens of this unusual echinoderm are known to exist, each measuring between 2 and 8 mm in diameter (Baker et al. 1986). Based on its novel morphology, *Xyloplax* was originally described as a new class within the Echinodermata, the Concentricycloidea, because it showed a substantially different body plan from what had been previously observed in the Echinodermata. However, phylogenetic data from morphology and rDNA support *Xyloplax* as being most closely related to other extant Asteroidea (e.g., Janies 2001). Recent phylogenetic arguments (Mah 2006) present concentricycloids as the sister group to all modern, crown-group asteroids.

1. Literature

All information pertaining to the distribution of this species in New Zealand is given by Baker et al. (1986), Rowe et al. (1988), Baker (2003), and Arnold (2004); searches of ASFA, Web of Science, and Google (**Xyloplax**) on 21 November 2005 and 7 November 2007 returned no additional material dealing with the distribution of this genus in New Zealand waters.

2. Museum holdings

All specimens are held by Museum of New Zealand Te Papa Tongarewa and the Australian Museum. NIWA's **AllSeaBio** database was examined for records on 26 August 2005, with no specimens recorded.

Examination of the NIWA Invertebrate Collection database **Specify**, a literature search, and consultation with relevant experts in May 2009 revealed no new records of *Xyloplax medusiformis*.

3. Summary

Xyloplax medusiformis is a species of echinoderm, now placed within an intraclass in the Asteroidea, associated with seafloor wood in the deep ocean. Although known from only two localities, at depths of about 1100–1200 m (about 40 km off Castlepoint and 90 km off Hokitika), the animal's small size, together with its poorly sampled wood habitat, probably mean that it is more widespread and abundant than indicated by the collection record to date. It is likely that this species is to be found in deep waters off other parts of New Zealand, particularly where forests exist alongside rivers capable of carrying logs to sea. There is no strong evidence that this species is threatened or endangered (although if populations are in fact small then they could be affected by bottom trawling). Further, it is now known that there are two other species of *Xyloplax*, *X. turnerae* from the Bahamas (Rowe et al. 1988) and *X. janetae* from the North Pacific (Voight 2005, Mah 2006), which suggests that still other species may be found and that known species may well be more widespread than is currently understood.

Information on the distribution of *X. medusiformis* was synthesised by John D. Booth NIWA, Wellington, and reviewed by Alan N. Baker (formerly of Museum of New Zealand Te Papa Tongarewa). Too little is known of its distribution to allow hotspots or the 90% distribution to be shown. The minimum depth was taken to be 1000 m since most trawling—and therefore opportunity for biological material—takes place at this depth or shallower, and has not returned any specimens. The closer the 1000 m depth contour is to the land, presumably better the chance that river-sourced waterlogged timber reaches that depth before decaying or sinking into the substrate. However the maximum depth of *X. medusiformis* can only be guessed as too little sunken wood taken from deeper than 1000 m has been examined. Collections of *Xyloplax* in the Northern Hemisphere have been made at 2000–2700 m (Voight 2005)—but because of differences in morphology and behaviour in those species, it was considered that a maximum depth of around 2000 m might be more reasonable for *X. medusiformis*—but this is very speculative. Also it is thought unlikely that waters as deep as 2000 m but more than 100 km or so from the coast would be likely to contain much extant timber on the seafloor. Therefore, with the criteria of extant forest, large rivers, and waters 1000–2000 m deep within 100 km of the coast, the 100% distribution was taken to include waters off the southwest of the South Island, the east coast from eastern Bay of Plenty to Kaikoura, and the southeast of the South Island. Other places off mainland New Zealand where waters 1000–2000 m deep are within 100 km of the coast are considered to be part of the Unknown distribution: even though they may not have large rivers and extant forests, they could still have timber that has floated there before sinking. The Known not to exist distribution will be all areas with depths less than 1000 m and over 2000 m. These

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.

4. References

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