Records of the Australian Museum (2025)
vol. 77, issue no. 2, pp. 121–135
https://doi.org/10.3853/j.2201-4349.77.2025.1910

Records of the Australian Museum
a peer-reviewed open-access journal
published by the Australian Museum, Sydney
communicating knowledge derived from our collections
ISSN 0067-1975 (print), 2201-4349 (online)

Well-connected worms: genetic connectivity of annelids (Melinnidae and Ampharetidae) across a biogeographical break in Australia's eastern abyss

Laetitia M. Gunton[1], Elena K. Kupriyanova[2,3], Christopher N. Roterman[1,4]

[1] School of the Environment and Life Sciences, King Henry Building, Portsmouth University, Portsmouth, United Kingdom

[2] Australian Museum Research Institute, Australian Museum, Sydney, NSW, Australia

[3] Department of Biological Sciences, Macquarie University, North Ryde, NSW, Australia

[4] Institute of Marine Science, Portsmouth University, Portsmouth, United Kingdom

Abstract. Marked species composition changes are observed between shallow-water (0–200 m) temperate and tropical fauna, however, this transition is not well documented in deep-water fauna (> 200 m). Along the east coast of Australia there is an apparent biogeographic tropical to temperate transition between 30–40°S for bathyal and abyssal fauna. This has been recorded for brittle stars (Echinodermata: Ophiuroidea) and certain benthic megafauna taxa combined but not tested for other taxa individually or tested with genetic data. During the 2017 RV *Investigator* expedition, a series of beam trawl and epibenthic sledge samples were taken from 13 sites along a south to north latitudinal transect along the east coast of Australia, from Freycinet Marine Park, 42°S, to Coral Sea Marine Park, 24°S, from 1,000 to 4,800 m depth. Three of the most abundant segmented worms (Annelida: Polychaeta) species, *Melinnopsis gardelli*, *Melinnopsis chadwicki* (Melinnidae) and *Jugamphicteis galatheae* (Ampharetidae) were morphologically identified, and the COI genetic marker was sequenced for 88 specimens. *Melinnopsis gardelli* was recorded across the biogeographical break from 42°S to 24°S. An AMOVA for the north and south populations revealed significant evidence of populations structuring of this species. The other two species, *M. chadwicki* and *J. galatheae,* were recovered from north and south respectively of the biogeographic break. One haplotype of *M. gardelli* was shared between two sampling locations south of the break, Jervis Marine Park and Freycinet Marine Park (distance 735 km), similarly, haplotypes were shared for *M. chadwicki* between locations 726 km apart and *J. galatheae* 950 km apart. We found genetic evidence of a break occurring at 28–35°S dividing *M. gardelli* populations in the north and south, additionally our data appeared to show a third central population for *M. gardelli*. However, the break was not strongly defined as *M. gardelli* was found to bridge across the transition. Our results indicated deep-sea annelid populations are well connected along sections of the eastern Australian margin, suggesting the designated deep-water Marine Parks function as an important network for these organisms.

Keywords: biogeography; deep sea; Annelida; phylogeography; macrobenthos
ZooBank registration: urn:lsid:zoobank.org:pub:3F6F91B7-E11B-4609-8DE3-71D4A5A4AF5F
ORCID iD: Laetitia Gunton, 0000-0003-4758-4974; Elena Kupriyanova, 0000-0003-0336-4718; Christopher Roterman, 0000-0002-6636-6078
Corresponding author: Laetitia Gunton **Email**: laetitia.gunton@gmail.com
Submitted: 9 December 2024 **Accepted**: 6 March 2025 **Published**: 7 May 2025 (in print and online simultaneously)
Publisher: The Australian Museum, Sydney, Australia (a statutory authority of, and principally funded by, the NSW State Government)
Citation: Gunton, L. M., E. K. Kupriyanova, and C.N. Roterman. 2025. Well-connected worms: genetic connectivity of annelids (Melinnidae and Ampharetidae) across a biogeographical break in Australia's eastern abyss. *Records of the Australian Museum* 77(2): 121–135. https://doi.org/10.3853/j.2201-4349.77.2025.1910