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# Revision of the brachiopod genus *Amphithyris* (Rhynchonelliformea: Platidiidae) with descriptions of two new species

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## Abstract

The recent brachiopod genus *Amphithyris* Thomson belongs to the family Platidiidae and to date comprises five species, *A. seminula* (Philippi, 1836), *A. buckmani* Thomson, 1918, *A. hallettensis* Foster, 1974, *A. richardsonae* Campbell & Fleming, 1981 and *A. parva* MacKinnon, Hiller, Long & Marshall, 2008. Like other platidiid genera, *Amphithyris* has a worldwide distribution, but is mainly found in the southern hemisphere, with the exception of *A. seminula* which occurs in the Mediterranean Sea. This study is the first revision of the genus *Amphithyris*. We describe two new species, *A. cavernicola* n. sp**.** from the Queensland Plateau, Coral Sea, Australia and *A. comitodentis* n. sp**.** from deep waters east of the South Island, New Zealand. *A. cavernicola* n. sp**.** represents the first record of the genus from Australian waters, whereas *A. comitodentis* n. sp**.** is the first species in the genus recorded from the deep sea. Additionally, we identified the type material of *A. seminula* in the brachiopod collection of the Museum für Naturkunde, Berlin and designated a lectotype for this species. Despite their simple shell morphology and few diagnostic features, we were able to clearly discriminate the (now) seven species by morphological (shell) characters such as absence/presence of a median septum, absence/presence of capillae, shell convexity and/or combinations of these. On the basis of all known records, the present distribution of *Amphithyris* spp. and a Cretaceous origin of the genus is discussed.

**Key words:** Brachiopoda, Platidiidae, *Amphithyris*, revision, biogeography, *A. cavernicola* n. sp., *A. comitodentis* n. sp.

## Introduction

The extant brachiopod genus *Amphithyris* was first described by Thomson (1918) on the basis of a single specimen collected during the Australasian Antarctic Expedition (1911–1914) in Cook Strait, New Zealand. The holotype of the type species, *Amphithyris buckmani*, was found attached to a stone together with the type series of *Liothyrella neozelanica*, a common terebratuloid brachiopod inhabiting the fjords and shelf areas around the South Island of New Zealand. Thomson (1918) described *A. buckmani* as a member of the subfamily Megathyrinae Dall based on its schizolophous lophophore. Originally found in postmetamorphic developmental stages, this character is usually interpreted as a product of paedomorphosis when observed as the adult condition in small-sized brachiopod species. However, Thomson had already discussed a possible relationship to *Platidia* by integrating Philippi's *Terebratula seminulum* into his new genus *Amphithyris* (see also Lüter & Sieben 2005; MacKinnon *et al.* 2008). Eventually, Thomson (1927) erected a new terebratellid subfamily Platidiinae (now Platidiidae Thomson, 1927), in which *Amphithyris* and *Platidia* were united as sister taxa.

To date, *Amphithyris* comprises five species: *A. buckmani* Thomson, 1918, *A. seminula* (Philippi, 1836), *A. hallettensis* Foster, 1974, *A. richardsonae* Campbell & Fleming, 1981 and *A. parva* MacKinnon *et al.*, 2008. When Foster (1974) described his new species *A. hallettensis* from material collected in the Ross Sea and at the South Orkney Islands, he was unable to locate the holotype of *A. buckmani* for comparison and used "immature"

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## References


Allan, R.S. (1931) On a new recent *Terebratella* from northern New Zealand. *The New Zealand Journal of Science and Technology*, 12, 385–387.

Atkins, D. (1958) A new species and genus of Kraussinidae (Brachiopoda) with a note on feeding. *Proceedings of the Zoological Society, London*, 131, 559–581.
http://dx.doi.org/10.1111/j.1096-3642.1958.tb00702.x

Atkins, D. (1959) The growth stages of the lophophore of the brachiopods *Platidia davidsoni* (Eudes Deslongchamps) and *P. anomioides* (Philippi), with notes on the feeding mechanism. *Journal of the Marine Biological Association of the United Kingdom*, 38, 103–132.
http://dx.doi.org/10.1017/s0025315400015630

Bitner, M.A. (2006) Recent Brachiopoda from the Fiji and Wallis and Futuna Islands, South-West Pacific. *In:* Justine, J.L. & Richer de Forges, B. (Eds.), Tropical Deep Sea Benthos. Vol. 24. *Mémoires du Muséum national d'Histoire naturelle*, 193, pp. 15–32.

Bitner, M.A. (2008) New data on the recent brachiopods from the Fiji and Wallis and Futuna islands, South-West Pacific. *Zoosystema*, 30, 419–461.

Bowen, Z.P. (1968) A guide to New Zealand recent brachiopods. *Tuatara*, 16, 127–150.

Campbell, H.J. & Fleming, C.A. (1981) Brachiopoda from Fiordland, New Zealand, collected during the New Golden Hind expedition, 1946. *New Zealand Journal of Zoology*, 8, 145–155.
http://dx.doi.org/10.1080/03014223.1981.10427955

Costa, O.G. (1852) Class V, Brachiopodi. *Fauna del Regno di Napoli*, 10, 1–60.

Dall, W.H. (1920) Annotated list of the recent Brachiopoda in the collection of the United States National Museum, with descriptions of thirty-three new species. *Proceedings of the U.S. National Museum*, 57, 261–377.
http://dx.doi.org/10.5479/si.00963801.57-2314.261

Davidson, T. (1852a) Sketch of a classification of Recent Brachiopoda; based upon internal organization. *Annals and Magazine of Natural History*, 9, 361–377.

Davidson, T. (1852b) Descriptions of a few new Recent species of Brachiopoda. *Proceedings of the Zoological Society, London*, 20, 75–83.

Davidson, T. (1887) A monograph of recent Brachiopoda, part II. *Transactions of the Linnean Society,* Series 2 (Zoology), 4 (2), 75–182.
http://dx.doi.org/10.1111/j.1096-3642.1887.tb00656.x

Dawson, E.W. (1971) A reference list and bibliography of the recent Brachiopoda of New Zealand. *Journal of the Royal Society of New Zealand*, 1, 159–174.
http://dx.doi.org/10.1080/03036758.1971.10419347

Dawson, E.W. (1991) The systematics and biogeography of the living Brachiopoda of New Zealand. *In*: MacKinnon, D.I., Lee, D.E. & Campbell, J.D. (Eds.), *Brachiopods through time*. Balkema, Rotterdam, pp. 431–437.

Duméril, A.M.C. (1806) *Zoologie analytique ou méthode naturelle de classification des animaux*. Allais, Paris, 344 pp.

Fischer, P. & Oehlert, P. (1891) Brachiopodes. *In*: Milne-Edwards, A. (Ed), *Expéditions scientifiques du TRAVAILLEUR et du TALISMAN pendant les années 1880, 1881, 1882, 1883*. Masson, Paris, 139 pp.

Foster, M.W. (1974) Recent Antarctic and Subantarctic brachiopods. *Antarctic Research Series*, 21, 1–189.
http://dx.doi.org/10.1029/ar021

Hatai, K. & Elliott, G.F. (1965) Family Platidiidae Thomson, 1927. *In*: Moore, R.C. (Ed.), *Treatise on Invertebrate Paleontology. Part H: Brachiopoda. Vol. 2*. Geological Society of America and University of Kansas Press, Boulder and Lawrence, pp. H832–H833.

Hertlein, L.G. & Grant, U.S. (1944) The Cenozoic Brachiopoda of Western North America. *Publications of the University of California at Los Angeles in Mathemathical and Physical Sciences*, 4, 1–235.

Hiller, N. (1994) The environment, biogeography, and origin of the southern African recent brachiopod fauna. *Journal of Paleontology*, 68, 776–786.

Lee, D.E., Gregory, M.R., Lüter, C., Zezina, O.N., Robinson, J.H. & Christie, D.M. (2008) *Melvicalathis*, a new brachiopod genus (Terebratulida: Chlidonophoridae) from deep sea volcanic substrates, and the biogeographic significance of the mid-ocean ridge system. *Zootaxa*, 1866, 136–150.

Lee, D.E., Robinson, J.H., Witman, J.D., Copeland, S.E., Harper, E.M., Smith, F. & Lamare, M.D. (2010) Observations on recruitment, growth and ecology in a diverse living brachiopod community, Doubtful Sound, Fiordland, New Zealand. *Special Papers in Palaeontology*, 84, 177–191.

Logan, A. (1979) The recent Brachiopoda of the Mediterranean Sea. *Bulletin de l'Institut Océanographique de Monaco*, 71, 1–112.

Logan, A. (2007) Geographic Distribution of extant Articulated Brachiopods. *In*: Selden, P.A. (Ed), *Treatise on Invertebrate Paleontology. Part H, Brachiopoda (Revised). Vol. 6*. Geological Society of America and University of Kansas Press, Boulder and Lawrence, pp. 3082–3169.

Lüter, C. (2008) Recent brachiopods collected during the deep-sea cruise SO168 ZEALANDIA with the research vessel FS SONNE between Mt. Spong (Tasman Sea) and the Chatham Islands (Pacific) in 2002/2003. *Fossils and Strata*, 54, 311–320.

Lüter, C. & Sieben, K. (2005) Types of recent Brachiopoda in the Museum für Naturkunde, Berlin: catalogue and taxonomic notes. *Mitteilungen aus dem Museum für Naturkunde in Berlin (Zoologische Reihe*), 81, 177–192. http://dx.doi.org/10.1002/mmnz.4850810206

MacFarlan, D.A.B., Bradshaw, M.A., Campbell, H.J., Cooper, R.A., Lee, D.E., MacKinnon, D.I., Waterhouse, J.B., Wright, A.J. & Robinson, J.H. (2009) Phylum Brachiopoda (lamp shells). *In:* Gordon, D.P. (Ed.), *New Zealand Inventory of Biodiversity. Vol. 1. Kingdom Animalia (Radiata, Lophotrochozoa, Deuterostomia)*. Canterbury University Press, Christchurch, pp. 255–267.

MacKinnon, D.I. & Lee, D.E. (2006) Platidioidea. *In*: Kaesler, R.L. (Eds.), *Treatise on Invertebrate Paleontology. Part H: Brachiopoda (Revised). Vol. 5*. Geological Society of America and University of Kansas Press, Boulder and Lawrence, pp. 2225–2228.

MacKinnon, D.I., Hiller, N., Long, S.L. & Marshall, B.A. (2008) *Neoaemula*, a new genus of platidiid brachiopod, with new observations on species referred to the Recent platidiid brachiopod genus *Amphithyris* Thomson. *Fossils and Strata*, 54, 321–331.

Monterosato, T. de (1879) Note sur l'espèce du genre *Platidia*. *Journal de Conchyliologie*, 27, 306–308.

Muir-Wood, H.M. (1955) *A history of the classification of the phylum Brachiopoda*. British Museum (Natural History), London, 124 pp.

Philippi, R.A. (1836) *Enumeratio Molluscorum Siciliae cum viventium tum in tellure tertiaria fossilium quae in itinere suo observavit. Vol. I*. Berlin, 267 pp.

Philippi, R.A. (1844) *Fauna molluscorum viventium et in tellure Tertiaria fossilium regni utriusque Siciliae Enumeratio. Vol. II*. Halle, 298 pp.

Richardson, J.R. (1981) Recent brachiopods from New Zealand - background to the study cruises of 1977-79. *New Zealand Journal of Zoology*, 8, 133–143. http://dx.doi.org/10.1080/03014223.1981.10427954

Risso, A. (1826) *Histoire naturelles de principales productions de l'Europe méridionale et particulièrement des celles des environs de Nice et des Alpes maritimes*. Levrault, Paris, 439 pp.

Thomson, J.A. (1918) Brachiopoda. *Scientific reports of the Australasian Antarctic Expedition*, Series C (Zoology and Botany), 4, 1–76.

Thomson, J.A. (1927) Brachiopod morphology and genera (Recent and Tertiary). *New Zealand Board of Science and Art*, 7, 1–338.

Waagen, W. (1883) Salt Range Fossils. I. *Productus*-Limestone fossils. *Memoirs of the Geological Survey of India, Palaeontologia Indica*, Series 13, 4, 391–546.

Williams, A., Carlson, S.J., Brunton, C.H.C., Holmer, L.E. & Popov, L. (1996) A supraordinal classification of the Brachiopoda. *Philosophical Transactions of the Royal Society London B*, 351, 1171–1193. http://dx.doi.org/10.1098/rstb.1996.0101

Zezina, O.N. (1985) *Present day brachiopods and problems of the bathyal zone of the oceans*. Akademia Nauk SSSR, P.P. Shirshov Institute of Oceanology, Moscow, 247 pp. [in Russian].