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New paedomorphic brachiopods from the abyssal zone of the north-eastern Pacific Ocean

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Abstract

New Recent very small but sexually mature brachiopods have been found at abyssal depths (4580–4850 m) in the Clarion-Clipperton Zone of the Pacific Ocean. They are characterized by simple (under-developed, juvenile) morphological features, which are interpreted here as paedomorphic, indicating the importance of heterochrony in the evolution of deep-sea brachiopods. We have described these brachiopods as representing two new genera and species, i.e. *Oceanithyris juveniformis* Bitner & Zezina (Family ?Dyscoliidae) and *Simpliciforma profunda* Bitner & Zezina (Superfamily Gwynioidea).

Key words: Brachiopoda, deep-sea benthos, Clarion-Clipperton Zone, north-eastern Pacific, new species, paedomorphosis

Introduction

Although brachiopods today constitute a minor group, they occur in all oceans of the world and at all depths except ultra-abyssal, in the trenches. Most species live in the neritic zone but many range down to the bathyal one, and only a few species reach the abyssal areas deeper than 3000 m (Zezina 1985, 1994, 2010; Logan 2007; Lee *et al*. 2008). This paper describes and illustrates the brachiopod fauna collected by V.P. Melnik in the years 2000–2006 at the Clarion-Clipperton Zone, which is located in the north-eastern Pacific (Fig. 1), to the south and south-east of the Hawaiian Islands, approximately between 0°–23°30’ N and 115°–160° W. It is bounded to the north and south by the ENE-WNW trending Clarion and Clipperton Fracture Zones. In this area, the seafloor depth is mostly between 4000 m and 6000 m.

Three species in the newly collected material, *Pelagodiscus atlanticus* (King, 1868), *Neorhynchia strebeli* (Dall, 1908) and *Abyssothyris wyvillei* (Davidson, 1878), are common and well known in the Pacific abyss. Additionally, however, very small brachiopods with remarkable features were also found. They look like young specimens but do not belong to any adult species recognized by us in the studied material. Thus, we propose here two new genera and species to accommodate these forms that combine juvenile morphological features with such adult characters as numerous growth lines indicating mature age and ripe female gonads. These new diminutive brachiopods provide further examples of paedomorphism and dwarfing, previously noted in brachiopods occupying marginal or extreme environments such as abyssal depths (Zezina 2003).

Material and methods

The material studied was collected during three “Yuzhmorgeologiya” cruises in 2000, 2003 and 2006 (Fig. 1; Table 1). Fifteen specimens were picked out from the surface of the manganese nodules (Fig. 2) by the second author (VPM). Specimens were bleached with 1–2% sodium hypochlorite to remove soft tissue, rinsed in water and dried. For electron-microscope examination, specimens were coated with platinum and examined using a Philips XL-20 SEM at the Institute of Paleobiology, Warszawa.

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