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Orbiniidae (Annelida: Errantia) from Lizard Island, Great Barrier Reef, Australia with notes on orbiniid phylogeny

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Abstract

The fauna of Orbiniidae (Annelida: Errantia) from the Lizard Island has been studied. Five species were found and each was redescribed and illustrated using light microscopy and SEM. *Scoloplos acutissimus* Hartmann-Schröder, 1991 and *Scoloplos dayi* Hartmann-Schröder, 1980 collected for the first time since their original descriptions and confirmed through re-examination of their type materials. Molecular analyses were carried out using nuclear 18S rDNA and mitochondrial 16S rDNA and CO1 gene sequences with evolutionary distances and the Neighbor-Joining Method. The molecular analyses did not support the monophyly of the genera *Scoloplos*, *Leitoscoloplos*, *Leodamas*, and *Naineris,* and its results are incongruent with morphological data.

Key words: *Scoloplos*, *Leitoscoloplos*, *Leodamas*, *Naineris*, 18S rDNA, 16S rDNA, CO1

Introduction

Species of Orbiniidae are moderate-sized elongate sediment-burrowing deposit feeders, inhabiting all depths from intertidal to abyssal. The main taxonomic revisions were done by Eisig (1914) and Hartman (1957). These publications redefined all genera and most of the common species, and Hartman (1957) arranged them in two subfamilies, Orbiniinae and Protoariciinae. Blake (2000) performed a cladistic analysis of the family based on morphological characters; the subfamily Protoariciinae was found to be an artificial group and consequently was synonymized with Orbiniinae, whereas the subfamilies Microorbiniidae and Methanoariciinae were erected. Subsequent molecular analyses (Bleidorn *et al.* 2005; Bleidorn *et al.* 2009) did not confirm this grouping and indicated that most of major orbiniid genera were paraphyletic.

Genera considered in present work—*Scoloplos* Blainville 1828, *Leitoscoloplos* Day, 1977, *Leodamas* Kinberg, 1866 and *Naineris* Blainville, 1828—belong to the subfamily Orbiniinae in both Hartman (1957) and Blake (2000) classifications. The main characteristic of *Naineris* is round to square shape of prostomium, which is pointed in other Orbiniinae genera. Three species of *Naineris* form a monophyletic sister group to *Protoaricia oerstedii* in molecular analysis by Bleidorn *et al.* (2009). Genus *Scoloplos* has four or less foot papillae plus stomach papillae in total, thoracic neuropodial hooks (also called spines or uncini) accompanied with capillary chaetae, and branchiae starting from chaetiger 8 or later. In the molecular analysis (Bleidorn *et al.* 2009) species of *Scoloplos* grouped with different clades of orbiniid phylogenetic tree. Genus *Leitoscoloplos* includes species that are generally similar to *Scoloplos*, but lack thoracic neuropodial hooks. The presence and number of thoracic hooks and hook-bearing segments may vary with size of the animal and some authors did not recognize this character as having generic significance (i.e., Pettibone 1957; Zhadan 1998; see Mackie 1987 for details of the history). Molecular analysis (Bleidorn *et al.* 2009) revealed that within Orbiniidae neuropodial hooks evolved independently or been lost few times. Diagnosis of *Leitoscoloplos* was emended by Eibye-Jacobsen (2002), who described *L. papillatus* with up to seven subpodal papillae. Recently species of *Leitoscoloplos* with up to 8 subpodal papillae

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