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Probathylepadidae, a new family of Scalpelliformes (Thoracica: Cirripedia: Crustacea), for *Probathylepas faxian* gen. nov., sp. nov., from a hydrothermal vent in the Okinawa Trough

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Abstract

A new pedunculate barnacle, *Probathylepas faxian* gen. and sp. nov., is described from a hydrothermal vent in the Okinawa Trough. A new scalpelliform family, Probathylepadidae, is also proposed for the new genus and species. Probathylepadidae differs from all other five families of the order Scalpelliformes by the capitulum bearing eight primal plates and two whorls of imbricating supplementary plates, and the peduncle being without scales. The relationships between the species of the new family and sessile barnacles are also discussed.

Key words: Cirripedia, Thoracica, new family, new genus and species, hydrothermal vent

Introduction

The cirripede superorder Thoracica Darwin, 1854 was considered to be divided into two orders, the Pedunculata Lamarck, 1818 and the Sessilia Lamarck, 1818, with the pedunculate suborder Scalpellomorpha Newman, 1987 comprised of seven families: Eolepadidae Buckeridge, 1983, Calanticidae Zevina, 1978, Pollicipidae Leach, 1817, †Zeugmatolepadidae Newman, 2004, †Stramentidae Withers, 1920, Lithotryidae Gruvel, 1905 and Scalpellidae Pilsbry, 1907 (Newman 1996; Liu & Ren 2007). In a revisionary paper, Buckeridge & Newman (2006) elevated the Scalpellomorpha to the order Scalpelliformes Buckeridge & Newman 2006, thus arranging the Cirripedia Thoracica into five orders: †Cyprilepadiformes Buckeridge & Newman 2006, Ibliformes Buckeridge & Newman 2006, Lepadiformes Buckeridge & Newman 2006, Scalpelliformes Buckeridge & Newman 2006 and Sessilia (Lamarck, 1818). The current classification system separates the recent scalpelliforms into five families: Calanticidae Zevina, 1978 (10 genera, 44 species), Eolepadidae Buckeridge, 1983 (4 genera, 7 species), Lithotryidae Gruvel, 1905 (1 genus, 3 species), Pollicipedidae Leach, 1817 (2 genera, 7 species) and Scalpellidae Pilsbry, 1907 (28 genera, 268 species) (Buckeridge & Newman 2006; Ah Yong *et al.* 2011).

The recent molecular study of Herrera *et al.* (2015) revealed the Scalpellomorpha is polyphyletic, being scattered throughout the Thoracica, and considered that the Neoverrucidae Newman, 1989 should be put into the scalpellomorphs rather than the Verrucomorpha Pilsbry, 1916. However, our current study is based on morphological characters only and uses the classification system current before the formal classification system proposed.

A new genus and species of stalked barnacle, *Probathylepas faxian*, is described herein from a hydrothermal vent in the Okinawa Trough. The new species does not fit into any existing scalpelliform family and, therefore, the new family Probathylepadidae is proposed to accommodate the new genus and species. The relationship between Probathylepadidae with other families is discussed based on morphological characteristics.

Material and methods

Material for this study was collected during an expedition to a hydrothermal vent area of the Okinawa Trough