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New species of *Hippopleurifera* (Bryozoa, Cheilostomata) from the Miocene Pirabas Formation, Pará state, Brazil

LAÍS V. RAMALHO¹, VLADIMIR A. TÁVORA², KEVIN J. TILBROOK³ & KAMIL ZÁGORŠEK⁴

¹Instituto Español de Oceanografía, Puerto Pesquero s/n, 29640, Fuengirola, Spain; Universidad de Málaga, Depto de Ecología y Geología, Málaga, Spain. E-mail: laiscanabarro@yahoo.com.br

²Laboratório de Paleontologia, Instituto de Geociências, Universidade Federal do Pará, caixa Postal 1611, Belém, Para, Brasil. E-mail: vladimir@ufpa.br

³Oxford University Museum of Natural History, Parks Road, Oxford, OX1 3PW, UK. E-mail: kevin.tilbrook@oum.ox.ac.uk

⁴Department of Geography, Technical University of Liberec, Studentská 2, CZ-461 17 Liberec, Czech Republic. E-mail: kamil.zagorsek@gmail.com

Abstract

The Pirabas Formation in Brazil has been studied for many years and a great diversity of animal groups (in particular fishes, molluscs and echinoderms) have been described from there, whereas the Bryozoa have scarcely been mentioned. New samples, collected specifically to focus on bryozoans, have shown that the diversity in this formation is higher than previously thought. Here we describe two new species belonging to the cheilostomate genus *Hippopleurifera*—*H. barbosa* sp. nov. and *H. confusa* sp. nov. Both species were collected at Atalaia Beach, northeastern Pará state, which boasts some of the best marine Cenozoic fossil outcrops in Brazil. After accounting for all described species, plus the two new species and four generic reassignments (new combinations) described herein, some 29 *Hippopleurifera* species are now known. Most of these are fossils from Europe or the USA, but a handful are known from the Recent Mediterranean, Caribbean and Indo-West Pacific.

Key words: Cenozoic fossils, marine, Romancheinidae, invertebrate paleozoology

Introduction

Sedimentary structuring of the Miocene in western Amazonia was mostly influenced by NW–SE normal faults, dipping northeasterly, and NE–SW strike-slip transfer faults. This structuring is a consequence of the breakup of Gondwana and is considered a manifestation of the final extensional deformation phase that effectively separated the South American and African continents (Costa *et al.* 1993; Rossetti & Góes 2004).

The Pirabas Formation (Maury 1925), with its type locality at the Pirabas River estuary east of Salinas County, Pará state (0°41'43"S, 47°10'23"W), outcrops intermittently in the northern Brazilian states of Pará, Maranhão and Piauí and provides some of the best marine Cenozoic paleontological outcrops in Brazil. According to Rossetti and Góes (2004), its occurrence on the continental portion of Pará state comprises of the Bragantina platform geotectonic unit, which is less than 60 m in thickness and rests directly on a basement that is Precambrian in origin. However, since formalization, its inclusion in the Pará-Maranhão Basin has been controversial (Trosdorf Jr *et al.* 2007).

The Pirabas Formation is characterized by limestones of varied structure, chemical composition and color, interleaved with fine beds of greenish to dark-grey claystone and calcareous sandstones. The formation attains its greatest thickness in the Barreirinhas Basin, however it stretches beyond the limits of this basin. For the purposes of this paper, the Pirabas Formation is informally included in the Pará-Maranhão Basin, as we consider that the upper part of the Ilha de Santana Formation (defined in this basin) corresponds to the Pirabas Formation as identified in the Barreirinhas Basin (see Trosdorf Jr *et al.* 2007; Soares *et al.* 2007).