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A new *Fenestulina* (Bryozoa, Cheilostomata) commensal with tube-dwelling anemones (Cnidaria, Ceriantharia) in the tropical southwestern Atlantic

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Abstract

A new species of cheilostome bryozoan, *Fenestulina commensalis* n. sp., was collected in December 2008 by scuba at 5–10 meters depth at Guaibura Beach, Guarapari, Espírito Santo state, southeastern Brazil. The specimen was found associated with tubes of the cerianthid *Pachycerianthus* sp., representing the first commensal association between a bryozoan and a tube-dwelling anemone. *Fenestulina commensalis* n. sp. is the third species of the genus found in Brazilian waters; it is distinguished from other Atlantic species of *Fenestulina* by its small angular orificial condyles, a single oral spine and basal anchoring rhizoids arising from abfrontal pore chambers. Morphological adaptations to encrust the tubes of cerianthids include anchoring rootlets and weakly contiguous zooids. These morphological features allow the colony the flexibility to grow around the tube and feed relatively undisturbed by silt and detritus, being raised well above the soft-sediment substratum in which the tube-anemone grows.

Key words: association, Bryozoa, Cnidaria, commensalism, *Pachycerianthus*, *Fenestulina*, new species, symbiosis

Introduction

The Tropical Southwestern Atlantic biogeographical province comprises northeastern Brazil, the coast of Espírito Santo (southeastern Brazil) and several oceanic islands—São Pedro and São Paulo Archipelago, Fernando de Noronha, Rocas Atoll, Trindade and Martin Vaz Islands (Spalding *et al.* 2007). This province has prominent ecosystems, with high biodiversity and rates of endemism. In this area new species are recurrently found that show the need for taxonomic research focused on the region (e.g. Grohmann *et al.* 1999; Moura & Sazima 2000; Leite *et al.* 2008). Although there has been an increase in the number of bryozoan species described in the area recently (Vieira *et al.* 2007, 2010a,b, 2012a, 2013; Santana *et al.* 2009; Almeida & Souza 2014), there are few studies on the ecology of bryozoans and their relationships with substrata in this area of the Brazilian coast (Vieira *et al.* 2012b).

Associations between marine bryozoans and tube-dwelling anemones have not previously been noted, despite the many commensal relationships between bryozoans and other invertebrates, including barnacles (Ross & Newman 1996), black corals (Vieira *et al.* 2012b), hermit crabs (Taylor *et al.* 1989; Taylor 1994), amphipods (Lörz *et al.* 2014), hydroids (Boero & Hewitt 1992; Piraino *et al.* 1992; Bavestrello *et al.* 2000) and sponges (Harmelin *et al.* 1994; Vieira *et al.* 2012b). Cerianthid tubes may have associations with different animals, some symbiotic (e.g. Emig *et al.* 1972; Stampar *et al.* 2010; Kim & Huys 2012). In subclass Ceriantharia (*sensu* Stampar *et al.* 2014) there are two different types of tube construction: weak tubes—found in Arachnactidae (Hartog 1977; Stampar *et al.* 2012)—which depend on the column of the animal to stand; and thick tubes—most tubes of Cerianthidae (Emig *et al.* 1972; Tiffon 1987)—which can stand erect, independent of the column of the animal. Species with thick tubes are susceptible to being settled by larvae of other organisms, usually in areas with little other available substratum.

Here we describe a new bryozoan species from Espírito Santo, Brazil, and we also report for the first time commensalism between a bryozoan and the tube-dwelling anemone *Pachycerianthus* sp.

d'Orbigny, 1851 (Vieira & Spencer Jones 2012), forming erect colonies. The basal rhizoids of *F. commensalis* (Figure 2C) also arise from abfrontal pore chambers, evidently supporting and anchoring the colony on an otherwise unstable substratum. Together with the weak interzooidal connections, these adaptations make the colony flexible enough to grow around the cerianthid tube.

Among other *Fenestrulina* species, at least one Australian species, *F. mutabilis*, also has rootlet-chambers in the basal wall, with colonies anchored by chitinous rhizoids. In *Fenestrulina pulchra*, only basal pore chambers have been observed, without rhizoids. In erect and tubular 'hemescharan' (Hastings 1932) colonies of *F. mutabilis* chitinous rhizoids may be present at the basal surface, which is often covered by sponges. In the bilaminar 'escharan' (Hastings 1932) colonies of *F. mutabilis* the rootlet-chambers are irregularly distributed and some spicules (possibly from a sponge) may be seen between the two layers of zooids. We have found only a single layered colony of *Fenestrulina commensalis*. The space between its basal surface and the cerianthid tube is filled by sediment (Fig. 2A). Additional effort is needed to find more colonies of this new *Fenestrulina*, to learn more about its distribution and association with *Pachycerianthus* sp.

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