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Sponge biodiversity of South Georgia island with descriptions of fifteen new species

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Abstract

Sponge samples were taken by SCUBA diving from sixteen sites on the north coast of South Georgia island, south west Southern Ocean. Fifteen new species are described: *Iophon husvikensis* sp. nov., *Clathria* (*Clathria*) *stromnessa* sp. nov., *Clathria* (*Axosuberites*) *rosita* sp. nov., *Clathria* (*Microciona*) *matthewsi* sp. nov., *Lissodendoryx* (*Ectyodoryx*) *collinsi* sp. nov., *Hymedesmia* (*Hymedesmia*) *barnesi* sp. nov., *Hymedesmia* (*Stylopus*) *pharos* sp. nov., *Myxilla* (*Burtoanchora*) *ponceti* sp. nov., *Tedania* (*Tedaniopsis*) *aurantiaca* sp. nov., *Tedania* (*Tedaniopsis*) *wellsae* sp. nov., *Mycale* (*Mycale*) *brownorum* sp. nov., *Mycale* (*Mycale*) *cartwrighti* sp. nov., *Haliclona* (*Soestella*) *crowtheri* sp. nov., *Microxina myxa* sp. nov. and *Calyx shackletoni* sp. nov. Information is also provided on the distribution and *in situ* external appearance of other sponge species such as *Cinachyra barbata* Sollas 1886, *Polymastia invaginata* Kirkpatrick 1907, *Iophon unicorn* Topsent 1907, *Phorbas glaberrimus* (Topsent 1917), *Myxilla* (*Ectyomyxilla*) *kerguelensis* (Hentschel 1914) and *Rossella nuda* Topsent 1901. These results increase the previously reported low sponge endemism in South Georgia, which now better aligns with the high endemism of other groups. However, because we sampled areas that have been poorly sampled in the Southern Ocean / Antarctic region (shallow subtidal, rocky), many of these species may have wider polar distributions. The effect of the Polar Front as a dispersal barrier to neighbouring biogeographic regions is discussed.

Key words: sponge, South Georgia, Antarctic, Southern Ocean, biogeography, SCUBA diving, taxonomy, endemic

Introduction

The remote sub-Antarctic island of South Georgia is located on the northern extension of the Scotia Arc, which links the Antarctic Peninsula to the Patagonian continental shelf (Fig. 1). Biogeographically South Georgia is considered part of the South Georgia district of the West Antarctic sub-region (Amphipods: De Broyer and Rauscher 1999; Molluscs: Linse 2002). South Georgia is considered a relatively old island with respect to other Scotia Arc islands (such as the South Sandwich Islands and South Orkney Islands) as it split from the Gondwana supercontinent approximately 30 Ma during the mid-Cenozoic (Dalziel and Elliot 1971). The island is also somewhat isolated, being separated from its closest neighbour by both distance and deep water (Hogg *et al.* 2011). The Southern Ocean is generally very deep with few continental shelf areas (Clarke and Johnston 2003), which suggest that a high degree of endemism may exist amongst the spatially disparate shallow coastal island habitats, especially amongst Phyla with poor dispersal capacities such as Porifera.

South Georgia is located just south of the Polar Front (PF), a northerly jet of the Antarctic Circumpolar Current (ACC) that is detectable down to 1000 m depth. This major oceanographic feature is a potential constraint on the northward dispersal of many Antarctic species (Clarke *et al.* 2005). To the south of South Georgia is the Southern ACC Front (SACCF) and the island's position between the PF and SACCF results in the shelf being both the warmest (~4°C) and the area with the biggest seasonal range (~5°C) of sea surface temperatures within the Southern Ocean (Barnes *et al.* 2006a). Regionally, coastal water is retained on the South Georgia shelf and may, in part, explain its high productivity which in turn supports commercial fisheries and a high diversity of marine bird and