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**A NEW BRYOZOAN RECORD (*BUGULA CALATHUS MINOR*)
FOR THE MARINE FAUNA OF MADEIRA ISLAND
(NE ATLANTIC)**

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With 1 figure

ABSTRACT. The bryozoan *Bugula calathus minor* Ryland, 1962 was recorded for the first time from the coastal waters of Madeira. It was found on boulders in the harbour of Funchal at 8 m depth. Due to a lack of knowledge on the bryozoan fauna around Madeira and on the general distribution of *B. calathus minor*, both natural or anthropogenic causes could be hypothesised for its occurrence.

RESUMO. A ocorrência do briozoário *Bugula calathus minor* Ryland, 1962 é descrita pela primeira vez para a ilha da Madeira. Foi observada aos 8 m de profundidade no porto do Funchal. Esta ocorrência poderá ser de origem natural ou antropogónica devido ao escasso conhecimento existente sobre os briozoários na Madeira e a distribuição geral de *B. calathus minor*.

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INTRODUCTION

During the last decade more than 130 species from the majority of phyla have been newly reported from the archipelago of Madeira (WIRTZ, 1998). With regard to the bryozoan fauna, intensive research took place from the mid 19th to early 20th century (*e. g.*, BUSK, 1858a, 1858b, 1859, 1860, 1861; JOHNSON, 1897; WATERS, 1899; NORMAN, 1909), when more than 100 species were described for the shallow waters of Madeira. However, since then the rich bryozoan fauna of Madeira has received little study or no research.

This note refers to a new record of a bryozoan subspecies found during research on marine invertebrates in the coastal waters of Madeira Island.

MATERIAL AND METHODS

Madeira Island is roughly located southwest of continental Europe, off the Moroccan coast, at approximately 32° 38' N and 16° 54' W. The survey was done from March to October 1998 by SCUBA diving and limited to a depth of 30 meters. The collected species that apparently had not yet been recorded from Madeira were fixed in 70% alcohol and identification confirmed in the laboratory.

Identification of bryozoan specimens was made according to ZABALA & MALUQUER (1988) keys and the description by RYLAND (1962). A stereomicroscope equipped with the software IAS® for image analysis was used to measure avicularia size. A sample of the unrecorded species was deposited in the collection of the Museu Municipal do Funchal (História Natural), Madeira, Portugal, (MMF 31648) and in the collection of the Marine Environment Research Centre, La Spezia, Italy.

RESULTS

Several colonies of the bryozoan subspecies *Bugula calathus minor* Ryland, 1962 (Cheilostomatida, Anascina) were found on boulders at about 8 meters depth within Funchal harbour. This subspecies was also collected from anchors of boats moored in the harbour, but never observed on any substrate outside the harbour. The harbour seafloor is characterised by boulders, sand and mud sediments.

The description of the specimens corresponded to that of RYLAND (1962). The colonies were cup-shaped, up to about 2.5 cm in diameter, straw coloured when living and paler, ivory, when dry. The zooids were oblong and of about equal width throughout their length. The avicularia were situated about one-third of the distance down the outer wall of the marginal zooids. The marginal avicularia scarcely exceeded the width of one zooid, and did not stand out in a manner visible to the naked eye. The beak was down-curved. Ovicells were globular, with a moderately wide aperture (Fig. 1 A & B).

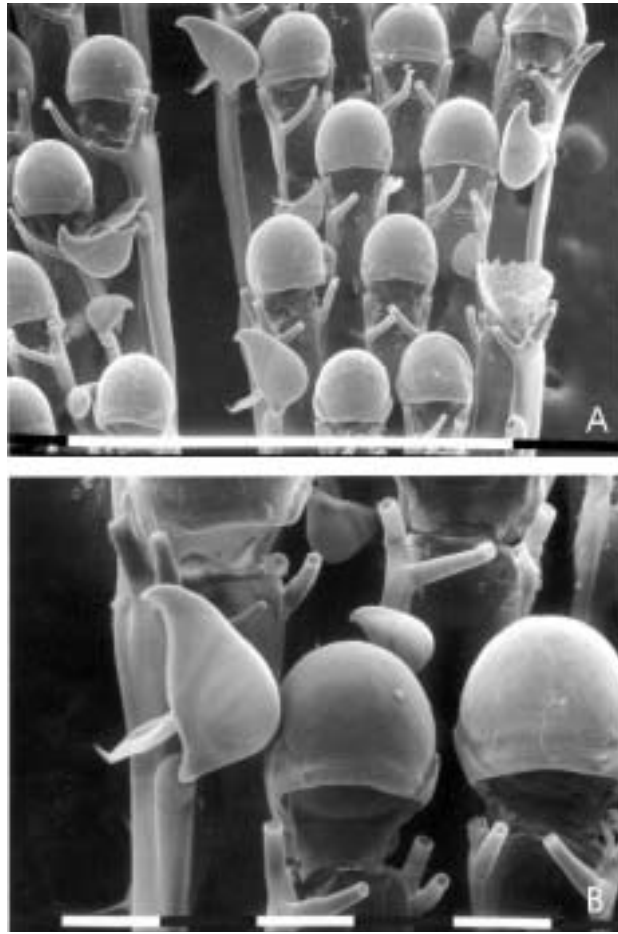


Fig. 1 - *Bugula calathus minor*. A - Zooids in frontal view (bar = 1 mm). B - Detail of avicularium on marginal zooid and ovicell (bar = 0.1 mm).

In the case of *Bugula calathus calathus* Norman, 1868 it is very large of the avicularia on the marginal zooids (400-500 μm long), which characterises the subspecies, their length equalling or exceeding the width of two zooids. Such large avicularia tend to stand out from the colony, giving it a hirsute appearance when seen with the naked eye. Consequently, in order to confirm this subspecies the authors measured the total length of avicularia of the marginal zooids and compared the data given by RYLAND (1962), since it is the only distinguishing feature between the two subspecies of *Bugula calathus*.

The mean length of 15 avicularia (standard deviation in parenthesis) was 233 (± 14) μm . The data given by RYLAND (1962) on the mean length of 20 avicularia was 276 (± 41) μm for *B. c. minor* and 443 (± 44) μm for *B. c. calathus*, with both colonies dredged at about 40 meters depth on *Posidonia oceanica* meadow in the Bay of Naples (Tyrrhenian Sea). The shape of the avicularia were also compared and equal to those pictured by RYLAND (1962) for *B. c. minor*.

DISCUSSION

Despite the fact of both subspecies of *Bugula calathus* are very similar on morphological characters, their distribution ranges are quite distinct. Whilst *B. c. calathus* distribution extends from the southern British Isles into the western Mediterranean (Spain, southern France, Italy), the subspecies *B. c. minor* occurs in the eastern Mediterranean and on the coast of Africa (RYLAND & HAYWARD, 1977). In the Mediterranean Sea it has also been recorded in the Tyrrhenian Sea and Ligurian Sea (BALDUZZI & EMIG, 1995). This new report of *B. c. minor* in Madeira waters extends its distribution range.

The presence of *Bugula calathus minor* in Madeira may suggest several hypotheses concerning its colonization, namely natural or anthropogenic. Considering the first one, it is known that the coastal marine fauna of Madeira is a mixture of both Mediterranean and distinctly tropical species (WIRTZ, 1998). Therefore, the Mediterranean outflow, being fed by intermediate and deep water (HARMELIN & d'HONDT, 1993), or, most probably, an upper current from the Cape Verde, Islands of the African coast (P. WIRTZ, pers. comm.), could be a source of colonization for the shallow water bryozoan *B. c. minor*. Since this subspecies was found exclusively in Funchal harbour, human influence (for example, species introduction on ships hulls or with ballast water) also seem to be an acceptable hypothesis for its occurrence in Madeira. However, both natural and anthropogenic hypotheses concerning the presence of *B. c. minor* in Funchal harbour should be considered, particularly because both the bryozoan fauna around Madeira and the general distribution of this subspecies are not sufficiently known and seldom recorded.

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