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THE NORTHEASTERN ATLANTIC SPECIES *MYCALE MICRACANTHOXEA* BUIZER & VAN SOEST, 1977 (PORIFERA, POECILOSCLERIDA) IN THE STRAIT OF GIBRALTAR (SOUTHERN SPAIN)

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ABSTRACT

The northeastern Atlantic species *Mycale micracanthoxea* Buizer & Van Soest, 1977 is a component of subtidal shallow water and brackishwater harbour poles and pontoons from The Netherlands, where it grows attached to shells, barnacles, etc. It was found in similar zones and habitats of Algeciras Bay (Gibraltar Strait, southern Spain) and Isla Cristina (Huelva, southern Spain) where it is very common. This new record constitutes the southernmost limit of the geographical range of this species. This article presents some data on the anatomical variability of *Mycale micracanthoxea*, along with a discussion on the possible causes of its observed distribution.

INTRODUCTION

The Gibraltar Strait is an area of great biogeographical interest, well known for the biotic exchange observed (Peres, 1985), due to its frontier location between Mediterranean and Atlantic waters. Although the water renewal in the Strait of Gibraltar is continuous, there is a conspicuous geographic area (the Algeciras Bay, with an extension of 30 km2) which supports an extensive human population (100.000 inhabitants) with some large public works (harbours, shipyards and breakwaters) and effluents of anthropogenic origin. A multidisciplinary research project of the Laboratorio de Biología Marina of the Universidad de Sevilla is in progress in this zone and nearby areas, and has reported the existence of little-known species including some new species to science (Naranjo & García-Gómez, 1993; Medel et al., 1993; Lopez de la Cuadra & García-Gómez, 1993).

In spite of this faunistic uniqueness, current

Fig. 1. Map of sampling localities (E1. Algeciras Bay; E2. La Antilla). Dots show where *Mycale micracanthoxea* is found.

knowledge on litoral sponges from the area is dispersed and only some works dealing with nearby areas have been published (Pansini, 1987; Maldonado, 1992). In this paper we redescribe *Mycale micracanthoxea*, a little known north Atlantic species. Some anatomical differences observed were considered inherent to species variability within a geographical range.

MATERIAL AND METHODS

The material has been deposited in the Laboratorio de Biología Marina of the Universidad de Sevilla (Spain) with register numbers: 271, 532 and 541. Specimens were collected in Algeciras Bay (36°8'0" N 5°24'40" W, between 3 and 12 m depth) on the Mediterranean side of the Strait of Gibraltar (southern Spain), and La Antilla (37°11'52"N 7°11'10"W, 8 m) on the Atlantic side of the Strait of Gibraltar (Fig. 1).

Preparation of dissociated spicules followed the techniques described by Rubio (1973) and Rützler (1974) for light and electron microscopy (SEM) respectively. The pictures of microscleres were taken on a scanning electron microscope

(SEM) PHILIPS XL 20 for which clean spicules, were dried on a cover glass and coated with gold.

RESULTS

Morphological description

Material examined: One specimen attached to *Watersipora subovoidea*, Isla Cristina (Huelva), 8 m depth, 30.12.91; one specimen growing over *Leptogorgia lusitanica*, Isla Cristina (Huelva), 8 m depth, 30.12.91; one specimen growing over *Balanus* sp., Algeciras Bay, 6 m depth, 06.01.93; one specimen growing over artificial rocks, Algeciras Bay, 10 m depth, 26.01.93.

External Description.-- All the specimens examined are thinly encrusting (thickness between 0.5 to 2.0 mm) growing on Bryozoa (*Watersipora subovoidea*, *Grisia* sp.), Anthozoa (*Eunicella* sp), rocks, etc. Specimens with a maximum extension of 5.2 x 3.2 cm have been measured. Surface of the sponge alive is rather smooth and bright; the texture is very soft. Ectosome is translucent, easily detachable from choanosome and not supported by any special skeleton except for some loose spicules. Oscula have not been observed in any specimen. Ostia slightly oval about 49 to 85 µm in diameter. The surface is uniformly subdivided by numerous pores (diameter about 0.1 to 0.5 mm).

Colour of live specimens is orange-ochre. In 70 % alcohol all the material is greyish-white.

Spicule complement (Figs. 2 a-g). -- Megascleres of one type: subtylostyles straight, often with hardly perceptible tyle, usually slightly bent in the middle. Length 216-256 (231) µm, width of shaft 4.6 µm and tyle 4.8 µm.

Microscleres include sigmas (two size classes), toxas (one class), palmate anisochelas (one class) and micracanthoxeas.

Sigma I robust, contorted: 38-50 (44) µm.
Sigma II thin, contorted: 16-30 (22) µm
Toxa thin, bow-shaped: 90-130 (113) µm
Anisochela: 11-15 (12) µm

Micracanthoxea with variable numbers of perpendicular spines: 3.5-6 µm

Skeletal arrangement. -- Tracts of subtylostyles ascend outwards from the basal plate and terminate at the surface in slight tufts or brushes, sometimes giving the sponge a hispid appearence. There is no tangential ectosomal skeleton. Spongin scarce.

The microscleres are strewn at random in both choanosome and ectosome. Anisochelas do not form rosettes.

DISCUSSION

Mycale micracanthoxea was described from several localities in the Dutch Delta area (SW Netherlands). It was reported as very common on harbour piles and pontoons (Buizer & Van Soest, 1977), growing attached to shells, barnacles, tunicates and hydroids. The species is easily diagnosed as the only one from the North Atlantic bearing micracanthoxeas.

There is only one other *Mycale* with minute micracanthoxeas, *Mycale bamfieldense* Reiswig & Kaiser,1989, from Vancouver Island (Canada). The latter differs from *M. micracanthoxea* mainly in having three size classes of anisochelas, only one class of toxas and in the different geographic location and habitat.

The habit and spiculation of our specimens agree closely with the original description of *M. micracanthoxea*. Some differences found are (Table I): the presence of only one size class of toxas, one size class of anisochelas and the less abundant micracanthoxeas in our specimens (in some specimens the presence of these is quite rare).

The species is also very abundant in the study zone, where it occurs on outer vertical surfaces in the harbour or on pontoons, growing over shells, bryozoans, barnacles, etc (Algeciras Bay); or on natural rocks close to the tie-up areas for international tankers (La Antilla, Huelva; Fig. 1). Algeciras Bay and Huelva are harbour zones with heavy marine traffic. The introduction of species by human activities has been studied by some authors (e.g. Zibrowius, 1983; Uriz, 1990),

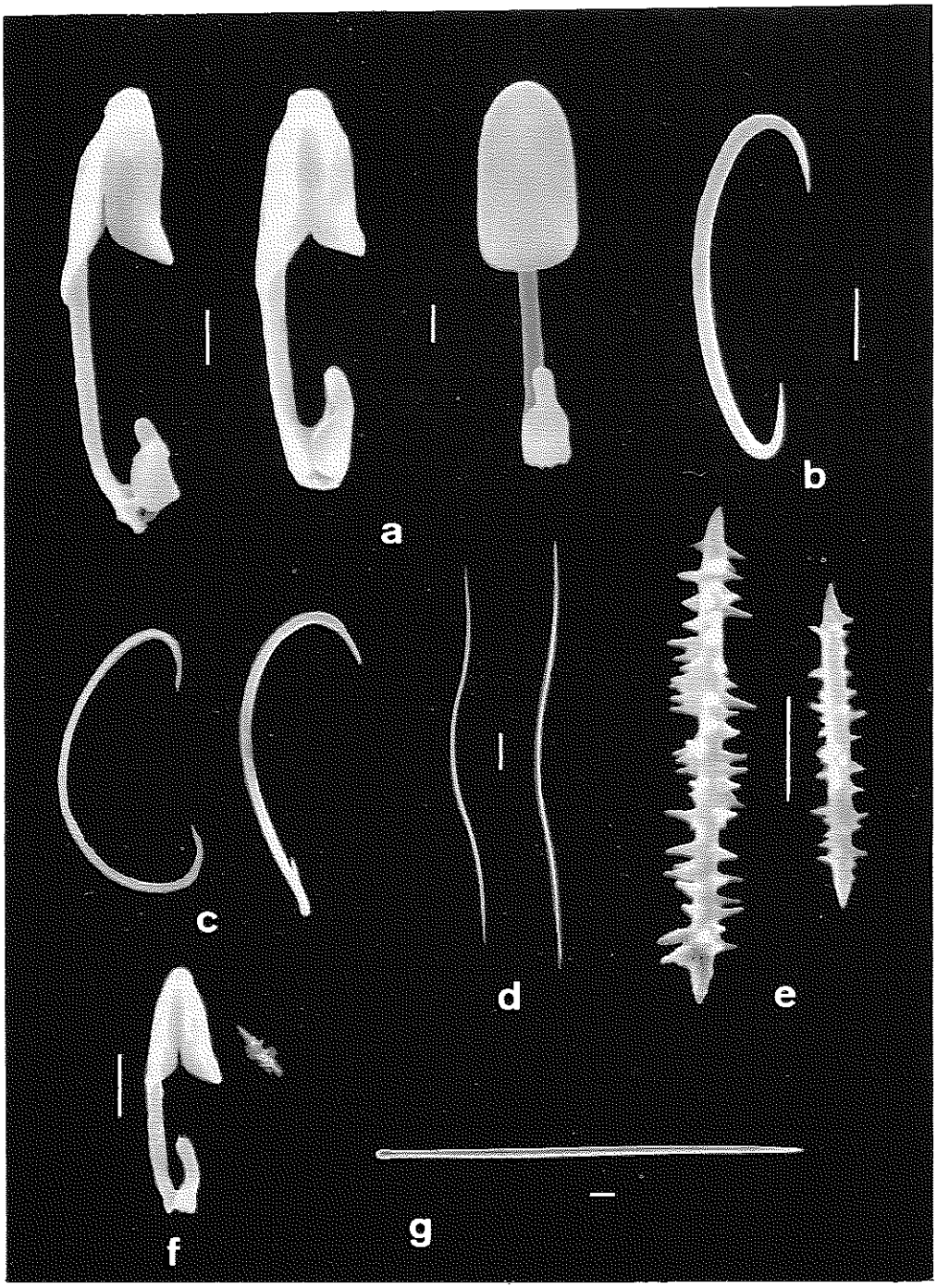

Fig.2. SEM photographs of spicules, a. anisochelae (left scale 1 μm, right 2 μm); b. large sigma (scale 10 μm); c. small sigmas (scale 3 μm); d. toxas (scale 10 μm); e. micracanthoxeas (scale 1 μm); f. anisochelas and micracanthoxea (scale 8 μm); g. subtylostyle (scale 15 μm).

Table I. Spicule dimensions of *Mycale* with microacanthoxeas. Measurements (in µm) are ranges of 10 or more spicules chosen at random, with means in parentheses.

species	subtylostyles	sigmas I	sigmas II	toxas I	toxas II	anisochelas I
M. micracanthoxea Buizer & Van Soest, 1977	256-(270)-285 x 7-7.5	58-(73)-89	19-(22)-24	100-(110)-120	13-(16)-20	-
M. bamfieldense Reiswig & Kaiser, 1988	247-(273)-297 x 2.8-11.7	35-(68)-75	13-(18.9)-24	19-(38)-70	-	28-(36.2)-41
our specimens	216-(231)-256 x 4.6	38-(44)-50	16-(22)-30	90-(113)-130	-	-

species	anisochelas II	anisochelas II	micracanthoxeas
M. micracanthoxea Buizer & Van Soest, 1977	20-(23)-32	13-(16)-20	7-8.5
M. bamfieldense Reiswig & Kaiser, 1988	16-(20.4)-24	9.4-(12.8)-16.9	3.2-(4.2)-7.1
our specimens	-	11-(12)-15	3-6

and these activities may inadvertently lead to changes in the distribution of marine species. The particular environmental conditions where *Mycale micracanthoxea* is located, always close to harbour zones where it is extremely abundant, suggest that it is possible that this species has been introduced directly attached to the hull of boats or on shells or barnacles attached to the hull. The dispersal hypothesis could be supported by the fact that the species is unknown for well-studied areas like Roscoff (Topsent, 1891; Borojevic et al., 1968; Cabioch, 1973) and Banyuls-sur-Mer (Topsent, 1892; Topsent, 1893; Boury-Esnault, 1971).

It is, nevertheless possible that this species is also common in other harbour zones along the eastern Atlantic coast, where it may have been overlooked by previous authors due to the small size of its micracanthoxeas, which makes them practically invisible in light microscopy. Within the genus *Mycale* there is a great variability in the presence or absence of certain categories of microscleres. In this paper we have seen the morphologic variability that the species *M. micracanthoxea* can present, which can account for finding specimens which possess toxas and anisochelas in either one or two size classes. In this sense, *M. macilenta* (Bowerbank) seems to be the species closest to *M. micracanthoxea* as far as spicular types and categories are concerned, disregarding the presence of micracanthoxeas. *M. macilenta* has only one size of sigmas, and three sizes of anisochelas (Topsent, 1924), but specimens have also been found with two categories of toxas (Rodriguez-Solórzano, 1990). Also, the form, color and lack of tangential ectosomal skeleton are other aspects which are similar in the two species.

We suggest that the use of SEM techniques is

a strong tool for the proper assessment of spicular diversity in *Mycale* and every other sponge genus bearing small microscleres.

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