

# The *Asterosmilia* Duncan, 1864 (Anthozoa Scleractinia) from El Lobillo (Estepona Basin, Spain)

Valeriano Spadini

Via A. Toti 4, 52046 Lucignano, Arezzo, Italy; e-mail: [spadiniv@inwind.it](mailto:spadiniv@inwind.it)

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## ABSTRACT

This work analyses three specimens of scleractinian coral (Anthozoa Scleractinia) recovered from the Pliocene of El Lobillo (Estepona basin, Spain). The specimens are assigned to the genus *Asterosmilia* Duncan, 1864 due to characters such as paliform lobes and dissepiments. The specimens resemble *Asterosmilia marchadi* (Chevalier, 1966) or *Asterosmilia prolifera* (Pourtales, 1871), currently living in the Atlantic Ocean.

## KEY WORDS

Scleractinia; *Asterosmilia*; Pliocene; El Lobillo; Spain.

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## INTRODUCTION

The scleractinian fauna (Anthozoa Scleractinia) of the Estepona basin (Spain) consists of 27 species belonging to 15 genera (Spadini, 2019). Other species of problematic classification have been found and are being studied separately. In this work, three specimens tentatively assigned to the genus *Asterosmilia* Duncan, 1864 are examined. They were found in the sands of El Lobillo, a locality previously identified erroneously as Chincheta (Spadini, 2019).

The genus *Asterosmilia* was recently reported from the Pliocene of the Manilva basin (Málaga, SW Spain) with a specimen attributed to *Asterosmilia* cf. *prolifera* (Pourtales, 1871) and other specimens of *Asterosmilia* undetermined at species level (Aguirre et al., 2020). In order to reconstruct cnidarian and marine landscapes, Aguirre et al. (2020) describe the taxonomic composition of cnidarian assemblages and their conservation, seeking clues about the paleo-communities that colonised the sea bottom and the paleo-environments in which they were formed.

On the contrary, this paper focuses on the morphology and internal structure of the specimens recovered in the Estepona basin.

## MATERIAL AND METHODS

Coral fossil samples were collected manually and were cleaned and brushed with water and hydrogen peroxide to remove sediment.

Identification was performed on the basis of macro and micromorphological characters related to corallum shape, development of radial elements, corallite diameter and columella development according to Wells (1956), Cairns & Wells (1987), Cairns (1979), and Zibrowius (1980). For the general characteristics of the study area see Spadini (2019).

ABBREVIATIONS. H = maximum height; Sx = septa of cycle x (S1, S2, etc.); MUSNAF = Museum of Natural Science, Accademia dei Fisiocritici, Siena (Italy).

## RESULTS

### Systematics

Subclassis HEXACORALLIA Haeckel, 1866  
 Ordo SCLERACTINIA Bourne, 1900  
 Subordo CARYOPHYLLIINA Vaughan et Wells, 1943  
 Familia CARYOPHYLLIIDAE Dana, 1846

Genus *Asterosmilia* Duncan, 1864

TYPE SPECIES. *Trochocyathus abnormalis* Duncan 1864, by subsequent designation by Vaughan (1919).

DIAGNOSIS. Solitary, ceratoid, trochoid or flabellate; free or attached. Paliform lobes precede penultimate and sometimes antepenultimate cycle of septa. Columella lamellar or fascicular. Endotheca abundant (Cairns & Wells, 1987).

REMARKS. The genus *Asterosmilia* is characterised and distinguished from morphologically similar genera (*Ceratotrochus* (*Edwardsotrochus*), *Trochocyathus* or *Caryophyllia* (*Ceratocyathus*), by ceratoid to trochoid corallite and by pali and endotheca. The columella is variously developed, generally lamellar or spongy, but in some cases the columella and pali may be missing (Cairns, 1979, 1987).

The genus *Asterosmilia* was established by Duncan (1876) for three Miocene fossil species from the Dominican Republic. Other species were subsequently described (Vaughan 1919; Vaughan & Hoffmeister, 1926; Duncan 1873; Pourtalès, 1871; Chevalier, 1966) and the different characters of the ten currently known species were summarised by Cairns & Wells (1987).

The genus is absent from the Italian Pliocene (Spadini, 2015) and its finding in the Manilva and Estepona basins reveals the proximity and therefore the strong influence of Atlantic fauna. The genus is particularly widespread in the West Indies and especially in the Miocene of the Dominican Republic (Cairns & Wells, 1987). Currently there are two living species: *A. prolifera* (Portalès, 1871), widespread in the western and eastern Atlantic, and *A. marchadi* (Chevalier, 1966) widespread in the western and eastern Atlantic, Indian Ocean and western and central Pacific (Cairns, 1979; Zibrowius 1980; Cairn et al., 1999). None of them are extant in the Mediterranean.

### *Asterosmilia* sp.

MATERIAL EXAMINED. EEl Lobillo (three specimens), leg. M.M. Brunetti (2015–2016). The studied material is preserved in the MUSNAF.

DESCRIPTION. The material consists of three specimens. The first is ceratoid in shape, 29.4 mm high; the second is conical, slightly flat, 19.2 cm high. A third slightly curved specimen, 15.25 mm high, is fragmented.

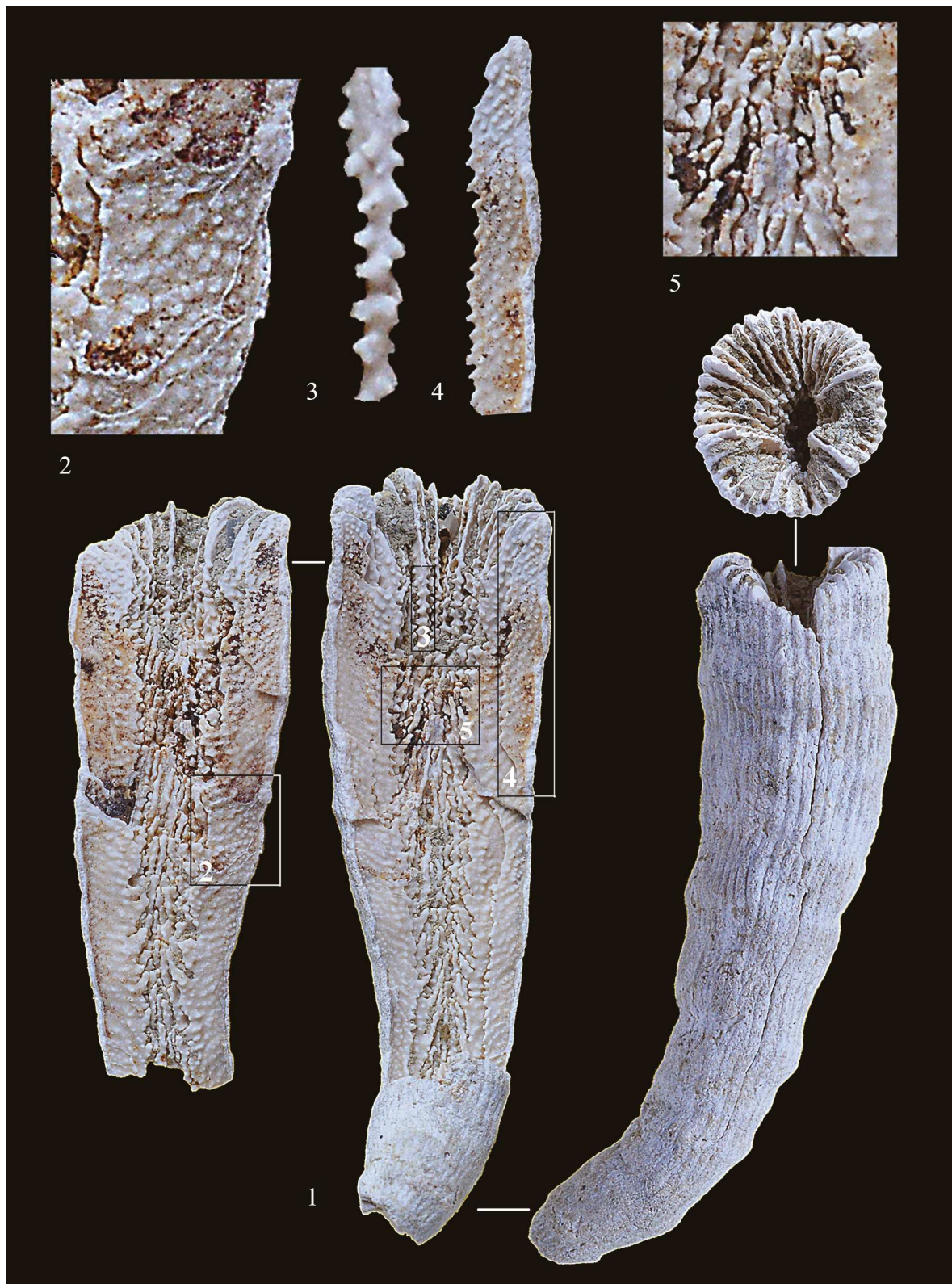
The largest specimen is distinctly ceratoid in shape, with many regular bulges. The base is open and the pedicel is about 5 mm in diameter. The costae are wavy, separated by evident grooves, covered in granules, but the surface does not seem well preserved. In the second specimen, the costae are flat, equal, with rounded granules and arranged without order. In the fragmented specimen, the costae of the dominant septa are more evident and slightly cristate near the calice.

The calice is almost circular to slightly elliptical. The fossa is very deep. The largest specimen has 44 septa, the second has 52, arranged in six systems. The fragmented specimen has a total of 68 septa. The septa of the first cycle ( $S_1$ ) are slightly more exerted than those of the second cycle ( $S_2$ ), the others are less evident.

The axial margin of  $S_1$  and  $S_2$  have many tubercles (Fig. 3), inner edge of  $S_3$  with paliform lobes, directed towards the centre of the coral (Fig. 5).  $S_4$  is reduced, with toothed or wavy margin (Fig. 4). The septa have generally elongated granules arranged along lines parallel to the margin of the septa. The columella is formed by the paliform lobes of  $S_3$ . There are rare but evident dissepiments in the lower half of the corallite (Fig. 2).

REMARKS. Despite the differences in size and shape, the three specimens described could be congeneric. Attribution to the genus *Asterosmilia* is sustained by the presence of paliform lobes and an endotheca, albeit not very pronounced.

These Pliocene specimens from Estepona basin differ from those figured by Aguirre et al. (2020), of which no morphological details are known, while they show some similarities with *Asterosmilia prolifera* and *Asterosmilia marchadi*, but they differ, at least in appearance, in columella characters.



Figures 1–5. *Asterosmilia* sp., Pliocene of El Lobillo (Estepona), H = 29.3 mm. Fig. 1: *Asterosmilia* sp. Fig. 2: dissepiments. Fig. 3: inner edge of S<sub>1</sub>. Fig. 4: inner edge of S<sub>4</sub>. Fig 5: paliform lobes of S<sub>3</sub>.



Figure 6. *Asterosmilia* sp. Pliocene of El Lobillo (Estepona), H = 19.2.  
Figure 7. *Asterosmilia* sp. Pliocene of El Lobillo. Fragmented specimen, H = 15.25.

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