

FIRST RECORD OF *CLAVULARIA CARPEDIEM* WEINBERG, 1986 (ANTHOZOA, STOLONIFERA) SINCE ITS ORIGINAL DESCRIPTION: TAXONOMICAL, ZOOGEOGRAPHICAL AND BATHYMETRICAL DATA

P. J. LÓPEZ-GONZÁLEZ & J. C. GARCÍA-GÓMEZ

López-González, P. J. & García-Gómez, J. C., 1993-1994. First record of *Clavularia carpediem* Weinberg, 1986 (Anthozoa, Stolonifera) since its original description: taxonomical, zoogeographical and bathymetrical data. *Misc. Zool.*, 17: 17-23.

First record of Clavularia carpediem Weinberg, 1986 (Anthozoa, Stolonifera) since its original description: taxonomical, zoogeographical and bathymetrical data.— The stoloniferous octocoral *Clavularia carpediem* Weinberg, 1986 has been found in the european side of the Strait of Gibraltar. This species is only known from the Alboran Sea. The distinguishing features of this species are the presence of sclerites in the tentacles, a very ornamented crown and the size range of the two principal groups of sclerites: thick spindles with complex tubercles and more slender ones, with simple tubercles, that occurs in the anthosteles and stolons. The external morphology of *Clavularia carpediem* Weinberg, 1986 from the Strait of Gibraltar and the variability of the sclerites are described. Some aspects related to its habitat, biology and zoogeography are discussed.

Key words: Anthozoa, Stolonifera, *Clavularia*, First record, Iberian peninsula.

(*Rebut: 13 XII 93; Acceptació condicional: 30 III 94; Acc. definitiva: 3 V 94*)

P. J. López-González & J. C. García-Gómez, *Lab. de Biología Marina, Fac. de Biología, Univ. de Sevilla, Apdo. 1095, 41080 Sevilla, España (Spain).*

INTRODUCTION

The Strait of Gibraltar is a zoogeographical highly interesting area, especially from the point of view of the exchange of species between Atlantic and Mediterranean waters.

The anthozoan fauna of the Strait of Gibraltar is still poorly known. Species of the order Stolonifera are common in benthic communities of the shallow waters, but are frequently muddled or omitted by the difficulty of a good specific identification. Inadequate descriptions of many species

have traditionally plagued the taxonomy of the stoloniferous octocorals with misinterpretations (BAYER, 1981; WILLIAMS, 1987). The genus *Clavularia* Blainville, 1830 is, among the genera living in european waters, the most numerous in species, partially due to the fact that the complete variability of the taxonomic characters has not been established.

A revision of the common circalittoral species of Stolonifera from the Mediterranean Sea was carried out by WEINBERG (1978). Some years later, WEINBERG (1986) showed

that *Clavularia crassa* (Milne-Edwards, 1848) and *C. ocracea* von Koch, 1878, two common species registered in the European literature, are conspecific that is two forms of a variable species. In the same work WEINBERG (1986) described a new species, *Clavularia carpediem*, on the basis of specimens found near Cabo Negro (Morocco). Since its original description, no new records were known.

This paper shows the variability found in specimens studied from the Iberian side of the Gibraltar Strait, and the distribution range of the species, by the moment only found in the Alboran Sea.

MATERIAL AND METHODS

Colonies of *Clavularia carpediem* were obtained by means of fishermen's nets and were directly fixed in formalin (4% in sea water). The colonies were preserved in a solution of ethyl alcohol (70% in sea water). Sclerites from different parts of the colonies were studied by scanning electron microscope, and semipermanent mounts were prepared for observation in the light microscope.

RESULTS

Order Stolonifera Hickson, 1883
Family Clavulariidae Hickson, 1894
Genus *Clavularia* Blainville, 1830

Clavularia carpediem Weinberg, 1986
Clavularia carpediem Weinberg (1986): 233
Clavularia sp. Silvestre (1987): 39

Material examined: La Atunara, Cádiz, southern Spain (36° 10' 54" N 5° 20' W) 10 colonies obtained by net of fishermen at 40 meters depth (March 1988).

Description: The colonies (figs. 1A, 1B) are composed of 10-20 polyps, the distance between polyps is 0.5-4.5 mm, they are joined by a very flattened and relatively wide stolons (1.7-3 mm), with 3 or 4 internal canals. In the stolons (fig. 2: 23-28) occur two principal groups of sclerites: relatively thick spindles with complex tubercles (268-180 x 62-50 µm) and more slender ones, with simple tubercles (280-95 x 47-25 µm).

The anthostele (fig. 1B) is elevated (3-5 mm) in the preserved and retracted specimens. The spicular density high. The sclerites are disposed as in other European species of the genus, orientated in the longitudinal axis of the polyp. Eight marked furrows are observed clearly on the surface of the anthostele. The sclerites (fig. 2: 16-22) belong to the same categories as those in the stolons, thick spindles with complex tubercles (265-165 x 77-57 µm) and thin spindles with simple tubercles (170-102 x 40-35 µm).

The anthocodia was not observed in full extension, scarce sclerites are present. The crown (fig. 1C) is very ornamented, composed by 7-10 lines of sclerites, spindles with simple tubercles (250-95 x 37-15 µm) (fig. 2: 1-6), around the base of the tentacles, and form a series of ridges, where the sclerites change their orientation displaying a parallel disposition at the axis of the tentacle. In the crown the sclerites (fig. 2: 1-6) are spindles with simple tubercles (295-50 x 35-17 µm).

The tentacles have nine pinnules, the sclerites (fig. 2: 7-15) are small and with flattened plates with irregular outline (135-60 x 40-20 µm). The sclerites are translucent white in color.

The general color of the colony varies from dirty white to cream.

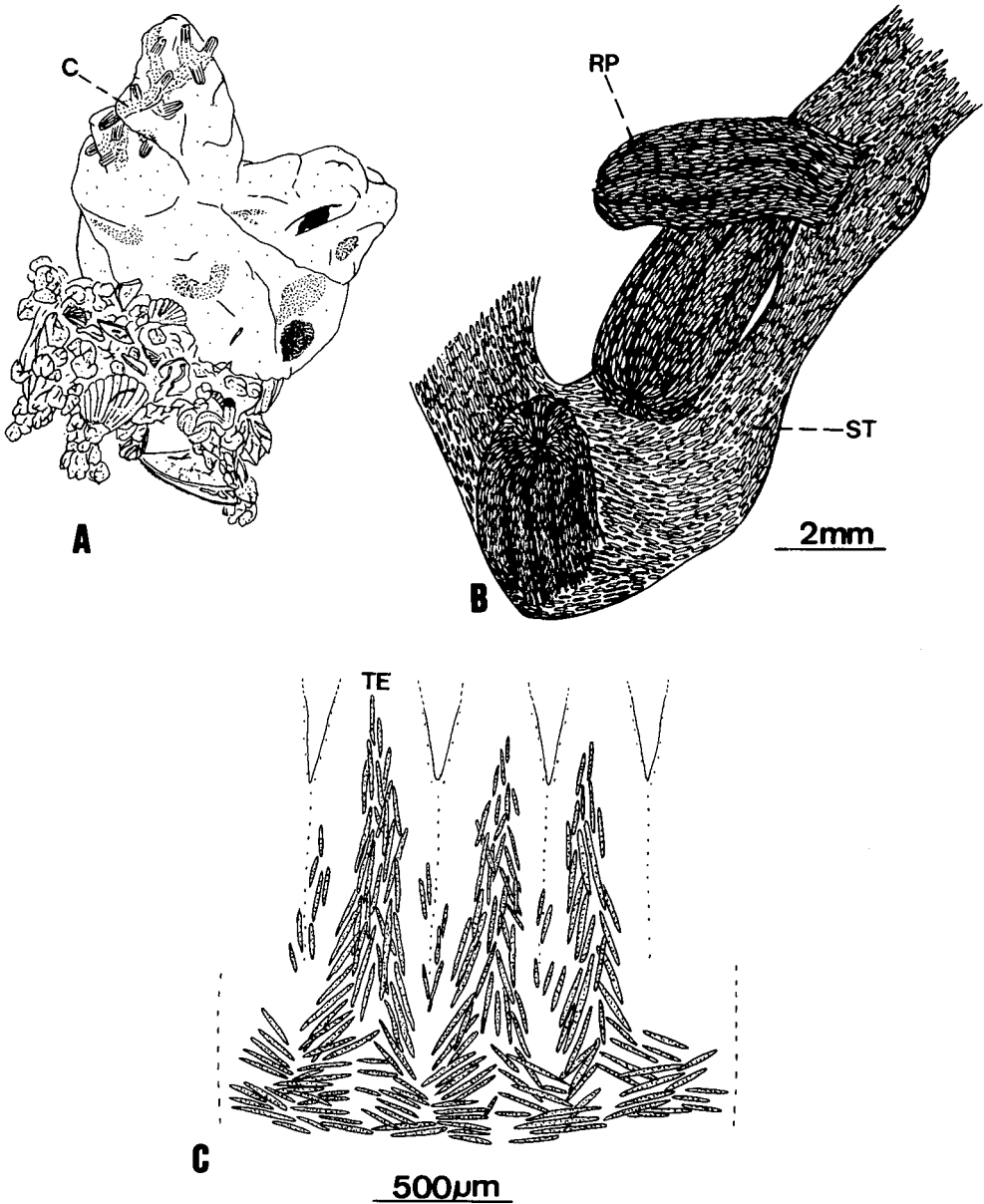


Fig. 1. *Clavularia carpediem* Weinberg, 1986: A. Colony on the tunic of *Microcosmus vulgaris*; B. Some polyps with stolon; C. Crown and base of the tentacles. (Abbreviations: C. Colony; RP. Retracted polyp; ST. Stolon; TE. Base of the tentacles).

Clavularia carpediem Weinberg, 1986: A. Colonia sobre la túnica de *Microcosmus vulgaris*; B. Algunos pólipos con estolón; C. Corona y base de los tentáculos. (Abreviaturas: C. Colonia; RP. Pólipo retraído; ST. Estolón; TE. Base de los tentáculos).

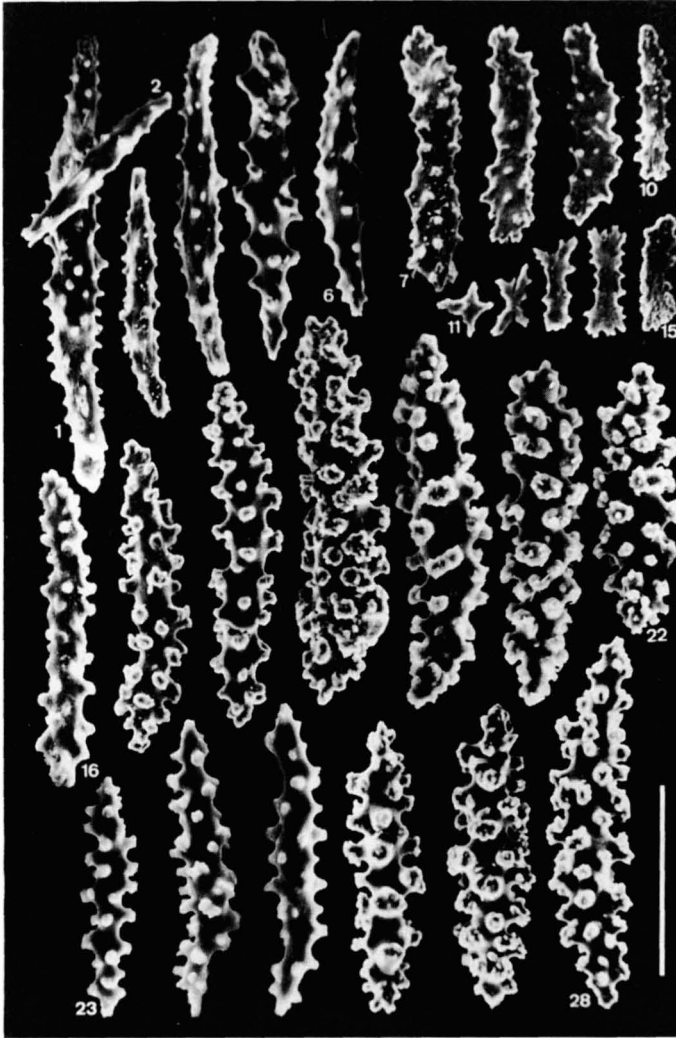


Fig. 2. *Clavularia carpediem* Weinberg, 1986, sclerites: 1-6. Spindles of the anthostyle; 7-15. Plates of the tentacles; 16-22. Spindles of the anthostyle; 23-28. Spindles of the stolon. (Scale bar: 150 μ m).

Clavularia carpediem Weinberg, 1986, escleritos: 1-6. Husos verrugosos del antocodio; 7-15. Placas de los tentáculos; 16-22. Husos verrugosos del antostele; 23-28. Husos verrugosos del estolón. (Escala: 150 μ m).

DISCUSSION

According to Weinberg's description, the characteristics of *Clavularia carpediem* are sufficient to distinguish it from *C. marioni* Koch (1891) (KOCH, 1891; see also WEINBERG, 1978) and *C. arctica* (Sars, 1861) (SARS, 1861; see also BROCH, 1912). *Clavularia carpediem* differs from *C.*

marioni by the presence of sclerites in the tentacles, a very ornamented crown, and the presence of thick sclerites with complex tubercles, absent in *C. marioni*. The dimensions of the polyps and of the character of the sclerites separate *C. carpediem* from *C. arctica*. The maximum length in the sclerites of the anthostyle is 380 μ m for *C. carpediem* (after WEINBERG,

1986), and 720 μm for *C. arctica* (see also WEINBERG, 1986). In the stolon, the maximum length is 290 μm and 510 μm for *C. carpediem* and *C. arctica* respectively (WEINBERG, 1986).

The spicular variability observed is slightly greater in relation to the original description of the species, displaced to rather lower values. The same variability is observed by SILVESTRE (1987) in the colonies collected from Seco de los Olivos.

This variability does not seem enough to propose a new species. The ranges of variation and the categories of the sclerites separates *Clavularia carpediem* from the remaining european species of the genus.

Weinberg found *Clavularia carpediem* growing on rocks, calcareous algae and axes of gorgonians in shallow water (15-22 m). SILVESTRE (1987) found some colonies of the genus *Clavularia* on the coralligenous bottoms of Seco de los Olivos (Almería,

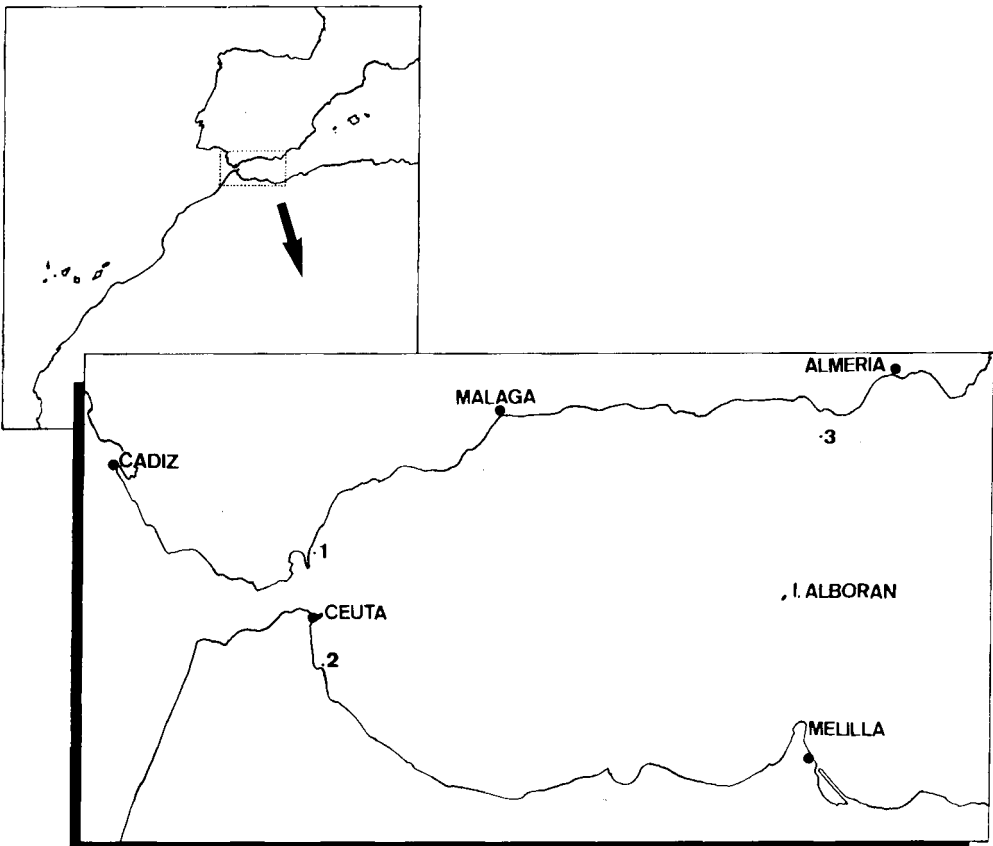


Fig. 3. Distribution of *Clavularia carpediem* Weinberg, 1986: 1. La Atunara (present study); 2. Cabo Negro (WEINBERG, 1986); 3. Seco de los Olivos (SILVESTRE, 1987).

Distribución de Clavularia carpediem Weinberg, 1986: 1. La Atunara (presente estudio); 2. Cabo Negro (WEINBERG, 1986); 3. Seco de los Olivos (SILVESTRE, 1987).

South Spain). The description given by Silvestre of her specimens identifies these colonies as belonging to *Clavularia carpediem*. The present record confirms the distribution of *Clavularia carpediem* on both sides of the Strait of Gibraltar, extending it to the coast of Almería (fig. 3).

The bathymetric distribution of *Clavularia carpediem* ranges from 15 to 50 m depth, at least. The specimens of Silvestre were obtained from uncertain depths somewhere between 47 and 200 m.

The habitat of the specimens studied by WEINBERG (1986), in general coincides with the ones quoted by SILVESTRE (1987). The latter finds the species on coralligenous bottoms, growing on *Dendrophyllia cornigera*, nodules of *Lithotamnium* sp. and at the basis of axes of gorgonian. The colonies of La Atunara are found in soft bottoms, attached to the tunicate *Microcosmus vulgaris* Heller, 1877, generally to the siphons. Other anthozoans found in the habitat were: *Sarcodictyon* sp., *Rolandia coralloides* Lacaze-Duthiers, 1900, *Alcyonium (Parerythropodium) coralloides* (Pallas 1766), *Alcyonium acaule* Marion, 1878, *Eunicella verrucosa* (Pallas, 1766) and *Leptogorgia sarmentosa* (Esper, 1791). Despite the works of WEINBERG (1978, 1986) and MANUEL (1981), the taxonomic status of some european stoloniferous octocorals is still problematic. A study with atlantic and mediterranean material has been carried out by LÓPEZ-GONZÁLEZ (1993).

Reproductive data of *Clavularia carpediem* are scarce. Weinberg found his specimens between July and September, without mentioning the reproductive status of the polyps. The colonies of La Atunara, collected in March, have no developed gonads. However, the material collected in August by Silvestre contained eggs.

ACKNOWLEDGEMENTS

We thank Dr. J. M. Gili (Instituto de Ciencias del Mar, C.S.I.C., Barcelona) and M.-J. d'Hondt (Musée National d'Histoire Naturelle, Paris) for their valuable help with information and literature. The SEM photographs were done in the Services of Electron Microscopy of the University of Seville. Appreciations to C.E.P.S.A., Sevillana de Electricidad, Excmo. Ayuntamiento de los Barrios, Mancomunidad de Municipios del Campo de Gibraltar and Agencia de Medio Ambiente (Junta de Andalucía) for financial support of this work.

RESUMEN

Primera cita de Clavularia carpediem Weinberg, 1986 (Anthozoa, Stolonifera) desde su descripción original: datos taxonómicos, zoogeográficos y batimétricos.

Clavularia carpediem Weinberg, 1986 es encontrada por primera vez después de su descripción original. La descripción de las colonias estudiadas por SILVESTRE (1987), como *Clavularia* sp., corresponde con la de WEINBERG (1986) para *C. carpediem*, por lo que se asume la identidad específica de ambas poblaciones. Se describen las colonias estudiadas de *Clavularia carpediem* a partir de material obtenido por redes de pescadores en La Atunara (Cádiz) (figs. 1, 2). *Clavularia carpediem* es comparada con las especies más próximas del género presentes en aguas europeas. Se reúnen todos los datos existentes sobre la distribución geográfica y batimétrica, así como los hábitats en los que ha sido hallada la especie. Hasta la fecha, *C. carpediem* ha sido encontrada únicamente en el mar de Alborán (fig. 3), entre Cabo Negro, Marruecos (WEINBERG, 1986), La Atunara, Cádiz (presente estudio) y Seco de los Olivos, frente Almería (SILVESTRE, 1987 como *Clavularia* sp.).

REFERENCES

- BAYER, F. M., 1981. On some genera of stoloniferous octocorals (Coelenterata: Anthozoa), with descriptions of new taxa. *Proc. Biol. Soc. Wash.*, 94(3): 878-901.
- BROCH, H., 1912. Bemerkungen über *Clavularia arctica* (M. Sars). *K. norske Vidensk. Selsk. Skr.*, 1911 (4): 1-8.

- KOCH, G. VON, 1891. Die Alcyonacea des Golfes von Neapel. *Mith. zool. Stm. Neapel*, 9 (4): 652-676.
- LÓPEZ-GONZÁLEZ, P. J., 1993. Taxonomía y zoogeografía de los Antozoos del Estrecho de Gibraltar y áreas próximas. Tesis doctoral, Universidad de Sevilla.
- MANUEL, R. L., 1981. British Anthozoa. In: *Synopses of the British Fauna*, vol 18: 1-241 (D. M. Kermack & R. S. K. Barnes, Eds.). Academic Press.
- SARS, M., 1861. Om nogle nye eller lidet bekjendte norske Coelenterater. *Forh. Vidensk.- Selsk. Christiania*, 1860: 140-151.
- SILVESTRE, R., 1987. *Antozoos de los fondos coralíferos del litoral sureste Ibérico y de la Isla de Alborán*. Tesis de licenciatura, Universidad de Valencia.
- WEINBERG, S., 1978. Revision of the common Octocorallia of the Mediterranean circalittoral. III. Stolonifera. *Beaufortia*, 27 (338): 139-176.
- 1986. Mediterranean Octocorallia: description of *Clavularia carpediem* n. sp. and synonymy of *Clavularia crassa* and *C. ochracea* on ethoecological grounds. *Bijdr. Dierk.*, 56(2): 232-246.
- WILLIAMS, G. C., 1987. A new species of stoloniferous octocorals (Cnidaria: Alcyonacea) from the south-western Indian Ocean. *Jour. Nat. Hist.*, 21: 207-218.