

## A new species of the genus *Eudistoma* (Ascidiacea, Polycitoridae) from Cape Verde

### *Una nueva especie del género Eudistoma (Ascidiacea, Polycitoridae) de Cabo Verde*

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#### Summary

Numerous colonies of *Eudistoma santamariae*, new species, were collected during several years from Sal Island. Their appearance in life is peculiar, with naked purple lobes erect above an extended layer of branched stolons embedded with sand and arranged in a web. The larva of this ascidian has a distinctive pigmentation. This new species is compared with other sandy *Eudistoma* from the west African coast.

#### Resumen

Numerosas colonias de *Eudistoma santamariae*, especie nueva, fueron colectadas durante varios años en la isla de Sal, Cabo Verde. El aspecto en vida es peculiar, con lóbulos de color púrpura erguidos encima de una capa extendida de estolones ramificados e incrustados de arena. La larva de esta ascidia tiene una pigmentación distintiva. Esta nueva especie es comparada con otros *Eudistoma* de arena de la costa oeste de Africa.

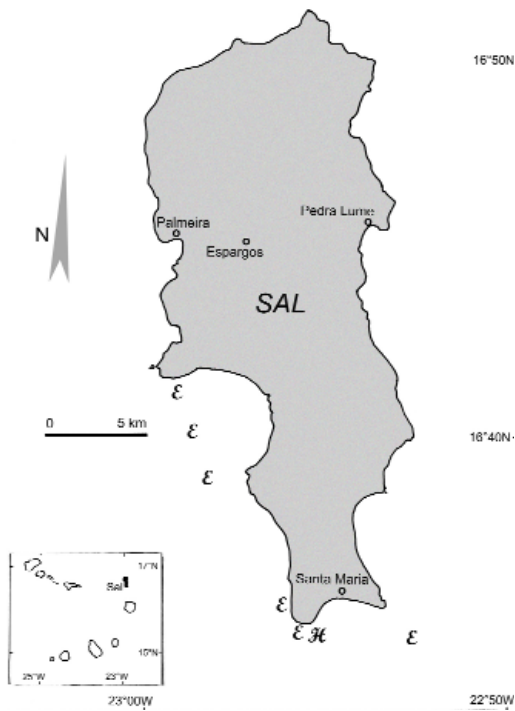
**Key words:** Ascidiacea, Taxonomy, *Eudistoma*, West Africa.

**Palabras claves:** Ascidiacea, Taxonomia, *Eudistoma*, Oeste Africa.

## INTRODUCTION

Ascidians are poorly known along the west coast of Africa and few species of the genus *Eudistoma* were recorded there. The new species described here is distributed on large areas in Sal island (Figure 1), the most northeastern island of the Cape Verde archipelago. This island is of volcanic origin (Miocene basalt). Some lava flows are presently underwater, especially around the southern part of the island where they are Miocene in age (COSTA TORRES, CELESTINO SILVA, SERRA LHEIRO, HERMINIA MENDES, ROCHA MACEDO, & MOTA GOMES. 2002) and consist in successive deeper steps. Submarine cliffs, 1-10 m high, are the present state of the ancient lava front walls, and there a columnar jointing is sometimes observed by divers. In spite of rather strong currents, every submarine lava plateau is covered with a layer of white, calcareous, biogenic coarse sand.

*Eudistoma* species are often found incrustated with sand, but with different colonies: globular, in flat sheets or closely packed lobes on a massive base. The colonies collected from Santa Maria (hence the species name) are exceptionally large as the basal stolons may reach



**Figure 1.**  
Map of Sal Island,  
**E**, areas where  
*Eudistoma santamariae*, new species,  
was collected or observed,  
**H**, type locality.

**Figura 1.**  
Mapa de la isla de Sal,  
**E**, areas donde  
*Eudistoma santamariae*, especie nueva,  
fue colectado u observado,  
**H**, localidad tipo.

50 cm in length. The nourishing zooids are grouped in protruding purple naked heads (Figure 2B), well spaced, raised above the sedimentary floor and suggesting a meadow (Figure 2A). The colonies are strongly attached to the hard basaltic substrate and are only to be found where the rock is covered with a layer of soft white sediment 0,5 to 1 cm thick.

Owing to the lack of terrigenous supply, the water is always very transparent, and down to 30 m deep, the luminosity is high.

The habitat of this ascidian, in a photophilic environment, on flat shallow sandy bottoms in Sal, is obviously responsible of the wide distribution and homogeneity of the population (Figure 2A, C).

## MATERIAL AND METHODS

Specimens were collected by SCUBA between 8 and 23 m deep, in August 1996, April 1997, March 2003, and from April to August 2004. Submarine pictures taken by G. Breton. Preserved in formaldehyde 4% in sea water, the specimens are strongly contracted and discolored (Figure 2D); the tunic is vitreous and the zooids turned light brown. The zooids are extremely difficult to extract from the sandy stolons without damage. Some have been stained with hemalum to study the internal structures.

## SYSTEMATICS

*Eudistoma santamariae* new species

(Figures 1-3)

**Holotype:** MNHN A3 EUD 311 - part of colony, Trois Grottes, Santa Maria, Sal island, Cape Verde, 01/05/2004, 18 m (coll. Breton). Additional material: A3 EUD 312, same station at different dates.

**Etymology:** from Santa-Maria, village in the southern part of the Isle of Sal (Figure 1).

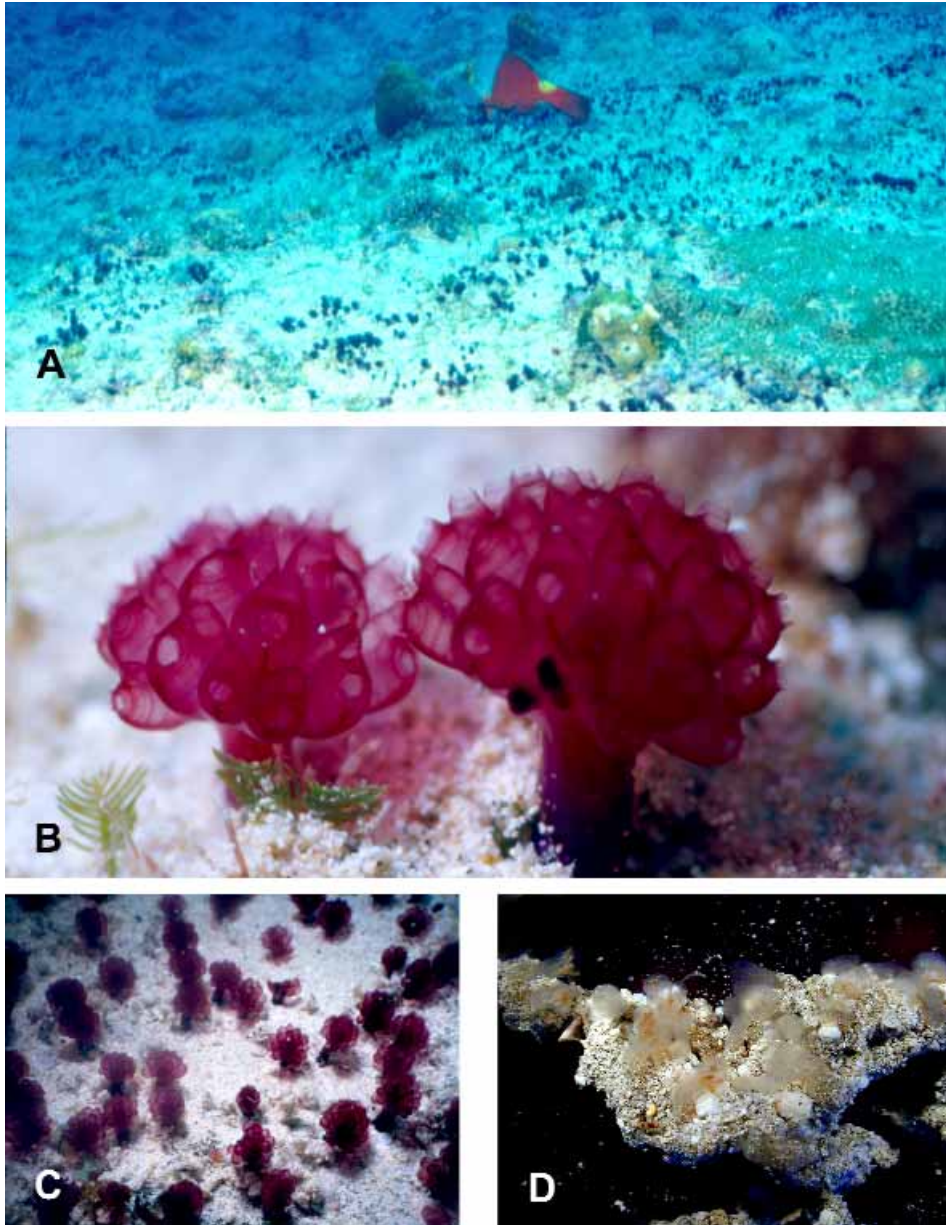
**Description:** The colonies are organised in a web of densely incrustated ramifications in which zooids and buds are embedded, from which vertically erect lobes emerge (Figure 2C, D). The latter are naked and transparent. They contain the thoraces of the nourishing zooids, and the anterior part of their abdomens. The thoraces can be seen by transparency through these purple "heads" (Figure 2B), the narrow cylindrical peduncles are also naked but opaque. Ten to 20 zooids open independently at the top of the lobes by short protruding siphons (Figure 2B). There is no system. In situ, the thoraces are wide, separated from the abdomen by a strong constriction. Beginning in a vertical position inside the peduncle of the vertical lobes, the abdomens bend to penetrate horizontally into the incrustated base. There, they take all directions intermingled with younger zooids and buds.

The basal tunic is very resistant, filled with sand. The densely packed zooids are very difficult to extract without damage. The total length of the zooids is variable but may reach 15 mm for a thorax only 1 mm long.

Both siphons are short with six lobes (Figure 3B). The tentacles are numerous, in three orders of length. The musculature is strong, and especially the transverse thoracic fibres. The longitudinal muscles reach the cardiac extremity where they part into two ribbons.

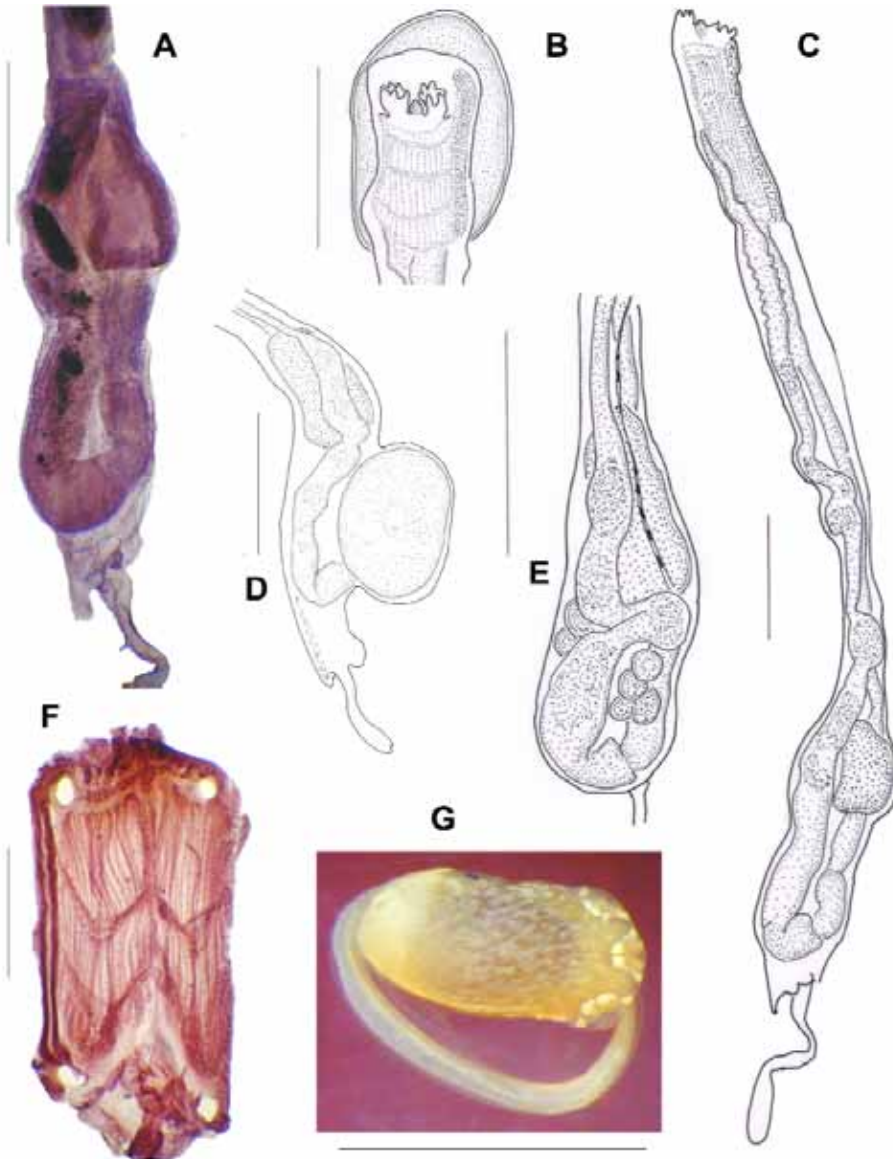
The branchial sac (Figure 3F) has about 20 elongated stigmata on each side in the first row, difficult to count; they are not curved dorsally. The rapheal languets are shorter than the stigmata and only slightly displaced on the left side. The abdomen often begins after a strong narrowing and remains thin its whole length, widening only at the stomach level (Figure 3C). The intestinal loop is narrow, both limbs of the intestine are straight and close together (Figure 3C). The stomach, longer than wide, has a smooth wall. The post-stomach is narrow, separated from the mid-intestine by a weak constriction (Figure 3A, C). The rectum is clearly individualised by a thickened ring (Figure 3A, C, D). The pyloric tubules are thin and straight, hardly visible, facing the stomach. The heart is terminal. The abdomen extends into one or several long vascular processes.

The gonads lie on each side of the gut loop, behind the stomach level (Figure 3D, E). The testis vesicles are not numerous, generally no more than a dozen, distributed above the intestinal limbs rather than between them (Figure 3E). A single oocyte matures at a time (Figure 3D), becomes very large into the ovary and protrudes at the side of the abdomen. One large embryo is seldom present into the distorted atrial cavity (Figure 3B). Only one well developed larva has been found inside the thorax, among the numerous colonies examined. The trunk, 1,6 mm in length, has a pale yellow epithelium marked with paler fuzzy stains (Figure 3G). The tail is wound in a little more than half a turn. The three adhesive papillae are short, widely spaced, and each is circled by yellow opaque pigment spots (remaining in formalin) (Figure 3G). No intermediate epithelial vesicles were detected.



**Figure 2.** *Eudistoma santamariae*, new species, A, population at 20 m depth, B, detail of two "heads" of a colony *in situ* showing the zooid arrangement, C, lobes of a single colony emerging from the encrusted base, D, part of a colony after fixation.

**Figura 2.** *Eudistoma santamariae*, especie nueva, A, población a 20 m de profundidad; B, detalle de dos lóbulos de una colonia mostrando el arreglo de los zoides *in situ*; C, lóbulos de una única colonia, elevados encima de la base incrustada; D, una parte de la colonia fijada.



**Figure 3.** *Eudistoma santamariae*, new species, A, intestinal loop of a young zooid stained with hemalum, B, thorax with an embryo into the atrial cavity, C, zooid of medium length extracted from a colony, D, intestinal loop with an oocyte, E, intestinal loop and testis vesicles, F, thorax opened along the ventral line and stained with hemalum, G, larva. Scale bars: A, B, C, D, E = 1 mm, F = 0,5 mm, G = 1,6 mm.

**Figura 3.** *Eudistoma santamariae*, especie nueva, A, asa intestinal de un zoide juvenil teñido con hemalumbre, B, tórax con embrión en la cavidad atrial, C, zoide de media talla sacado de la colonia, D, asa intestinal con ovocito, E, asa intestinal y folículos del testículo, F, tórax abierto en la línea ventral y teñido con hemalumbre, G, larva. Escalas: A, B, C, D, E = 1 mm, F = 0,5 mm, G = 1,6 mm.

## DISCUSSION

This species is original by the structure and extent of the colonies and by the large size and pigmentation of the larva.

An incomplete colony of *Eudistoma* sp. was described by MONNIOT & MONNIOT (1967) from Cape Verde with similar but immature zooids, and a broken encrusted base. This colony probably belongs to *E. santamariae*, new species.

A study of shallow epibenthic communities of Sal Island, (MORI, CATTANO-VIETTI, SARTONI, & BANCHI, 2000) reported the presence of an ascidian, only identified after a photo as *Distaplia corolla* Monniot F., 1974, collected from a moderate exposed site of the west coast. Similar in shape and colour it may be *Eudistoma santamariae*, new species.

Few publications reported diverse ascidians from Cape Verde. The first historical reference is by RENNIE & WISEMAN (1906), some ascidians are briefly described but no *Eudistoma*. MONNIOT & MONNIOT (1967) described specimens collected during the "Calypso" cruise with a single *Eudistoma* sp., and later (1994) shallow and deep species collected by the Harbor Branch Oceanographic Institution, but no Polycitoridae.

Some *Eudistoma* species are recorded from the tropical coast of West Africa. MICHAELSEN (1914) described *E. angolatum* (a massive sandy colony with small larvae) and *E. paesslerioides* with several varieties, also sandy and massive. MILLAR (1953) described, from Ghana, *E. accrum* with a flat gelatinous colony and small zooids, and *E. ramosum* more similar to *E. santamariae*, new species, in having sandy branched lobes but without naked heads and a larva only 0,4 mm in length. Three species are recorded from Senegal: *E. planum* Pérès, 1948 with round vitreous colonies, *E. almadiense* Pérès, 1953 with small dark colonies and small zooids, *E. ifani* Monniot F., 1969 in low cushions with few sand grains at the base.

## ACKNOWLEDGMENTS

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