

***Trididemnum maragogi* sp. nov. (Ascidiacea, Didemnidae)
from Alagoas, Northeastern Brazil¹**

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ABSTRACT. The new species of didemnid ascidian, *Trididemnum maragogi* sp. nov., is described from the Northeastern Brazilian coast. Many small colonies aggregate on calcareous algae. They are brown and more or less covered by spicules, depending on exposure to the sun, which suggests the presence of symbiotic algae. This species is characterized by a non pigmented zooid with a very long oral siphon bordered by six finger-like lobes, a branchial sac with anterior and posterior non perforated areas, a short muscular process on the esophageal peduncle and a testis with one large follicle partially surrounded by 6-7 coils of the sperm duct.

KEY WORDS. Ascidiacea taxonomy, Didemnidae, *Trididemnum*, Northeastern Brazil

The only *Trididemnum* Della Valle, 1881 (Aplousobranchia, Didemnidae) species previously known in the Brazilian coast is *Trididemnum orbiculatum* (Van Name, 1902) (RODRIGUES & ROCHA 1993; RODRIGUES *et al.* 1998). MILLAR (1977) reported an unidentified species of *Trididemnum* from the northeastern littoral of Brazil (08°09'9S, 34°45'8W; 09°11'1S, 35°07'W; 10°13'6S, 35°55'6W) whose description does not match with the species here described.

MATERIAL AND METHODS

Specimens were collected on the Galés Reefs at depths of 0.2 to 1 m. These reefs are located 6 km off the coast in the municipality of Maragogi, Alagoas State. The reefs are very shallow and the colonies were collected by free diving, together with their *Halimeda* sp. substrate. Samples were anesthetized in menthol and then fixed in 4% formaline. The holotype was deposited in the Museu de Zoologia, Universidade de São Paulo (MZUSP) and other vouchers and permanent slides at the collection of the Departamento de Zoologia, Universidade Federal do Paraná (DZ UFPR).

RESULTS

***Trididemnum maragogi* sp. nov.**

Figs 1-2

Material studied. Holotype: colonies fixed on coralline alga from Recife das Galés, 6 km off the coast in the municipality of Maragogi, Alagoas State, 01.III.1995 (MZUSP 13836). Paratypes: permanent slide with decalcified colony cross-sections (MZUSP 13837), permanent slide with zooids (MZUSP 13838); colonies on coralline alga DID146, DID 147 (DZ UFPR); permanent slides DID2-50, DID2-51, DID2-53, DID2-54 (DZ UFPR).

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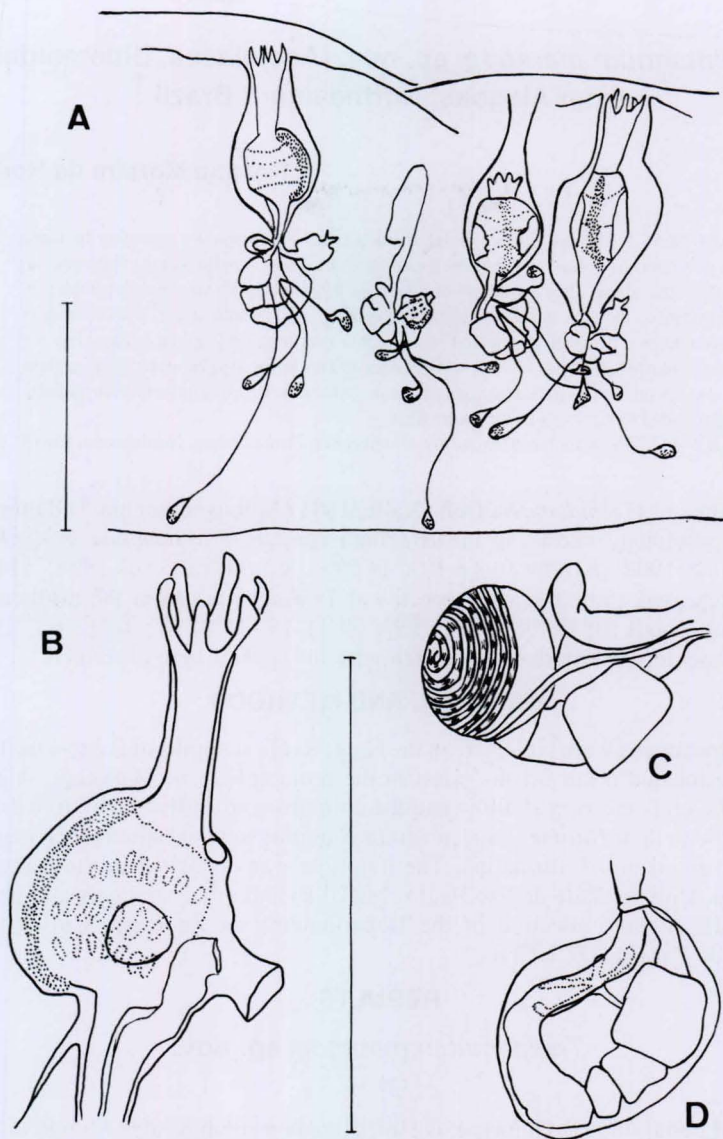


Fig. 1. *Trididemnum maragogi*. (A) Cross section of a decalcified colony; (B) thorax; (C) abdomen with testis; (D) abdomen with pyloric tubes. Scales = 1mm.

Description. Colonies are elongated (maximum length of 2 cm) or small and rounded, usually 3 to 4 mm thick and loosely attached to the talus of *Halimeda* sp. (Chlorophyta, Halimedaceae, Caulerpales). In shadowed or vertical substrates colonies are brown with white borders, while on sunny and horizontal substrates most of the colony surface is white due to greater concentration of spicules, with

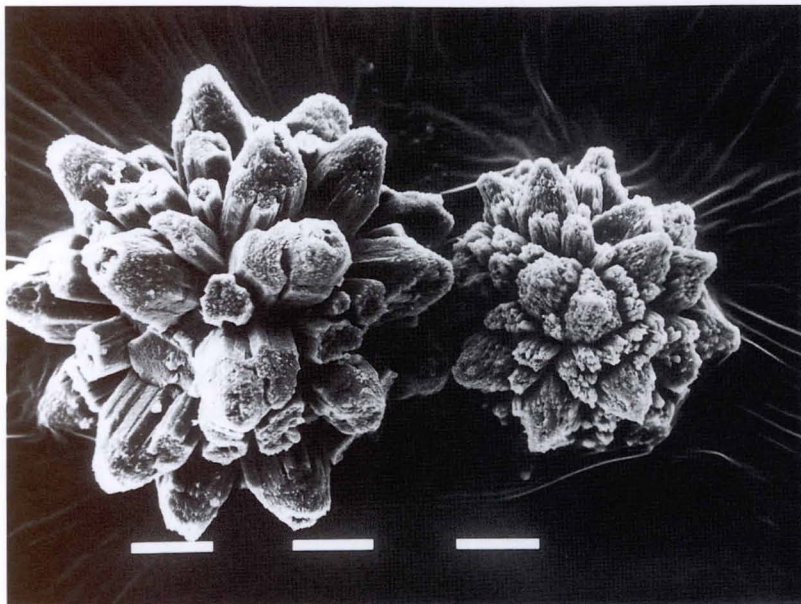


Fig. 2. *Trididemnum maragogi*, spicules. Scales = 10 μ m.

only brown borders. It was not possible to confirm the presence of symbiotic algae in the tunic but the color types and the presence of greater number of spicules in colonies exposed to the sun suggest algae. Further, colonies in fixative are either greenish or white with a mass of green pigment in the center.

Zooids do not form systems and one to three small and narrow cloacae are present on each colony. The cloacal cavities are very reduced and comprise canals linking zooids on the thoracic level (Fig. 1A). Spicules are evenly distributed on the surface as well as inside the colony, sometimes in low densities and some times in high densities resulting in a very brittle tunic. A thick layer of tunic filled with spicules occurs beneath the zooids. Spicules are star-like with conical blunt rays and maximum length of 55 μ m (Fig. 2).

Zooids are 1 mm or less, with thoraxes larger than abdomens. The mantle is completely transparent and there is no pigment on the endostyle. A remarkable feature of this species is the long oral siphon of the same length as the thorax, with six finger-like lobes on the margin (Fig. 1B). Only the circular musculature is conspicuous on this long oral siphon. The atrial siphon is tubular and short and is located either in the middle or in the posterior third of the abdomen. Musculature of the thorax is inconspicuous but with seven slender longitudinal muscles on each side; these form a short muscular process in the middle of the esophageal-rectal peduncle. The thoracic organ is round and protruding and may be as large as two or three stigmata while sometimes it is smaller and oval. Its position varies even in the same zooid, either between the first and second or between the second and third rows of stigmata, and it is central or displaced in the direction of the atrial siphon.

The branchial sac, always strangulated in the middle, is not perforated in either the anterior or posterior areas. The endostyle is very long and its anterior end curves into the pharynx. There are three rows of stigmata with nine stigmata in the first half row, and seven to eight in the second and third half rows. The two dorsal languets are displaced to the left side. There are 12 simple oral tentacles of three size orders.

The esophagus is very long and the esophageal-rectal peduncle is strangulated in the second third of its length. The stomach is rectangular or trapezoidal, with a smooth wall. There is a long pyloric area. The intestinal loop is not deep and so the intestine passes over the stomach (Fig. 1C). There are four pyloric tubes on the right side of the intestine which merge, one branch of which goes to the stomach (Fig. 1D). Usually three stolonial vessels occur except in budding zooids, which contain five, and at least one or two of them are very long, reaching the base of the tunic (Fig. 1A).

The testis is very large and one lobed. Sperm duct coils are loose, forming six or seven turns that do not completely cover the usually round or slightly conical testis. Ovaries were not present in the colonies examined. One of the colonies had a few poorly developed larvae.

Etymology. The species is named after the type locality. Maragogi is the name of the coast village where the species was collected.

DISCUSSION

Two *Trididemnum* species have been reported from Brazil: *T. orbiculatum* (Van Name, 1902) and *Trididemnum* sp. (MILLAR 1977). *T. orbiculatum* has a dark pigment on the thorax and abdomen in some specimens; spicules are concentrated in the upper layer of tunic and the muscular process is long (VAN NAME 1945). According to MONNIOT (1983), the base of the muscular process is near the esophageal aperture and this species has more stigmata in each row than the species described here. MILLAR (1977) described a specimen from the northeastern littoral of Brazil that he could not identify, but it is different than the species described here because of the larger spicules, presence of brown pigment on the thorax, and the shorter oral siphon (Tab. I).

Other species from the western Atlantic are *T. cyanophorum* Lafargue & Duclaux, 1979, *T. hians* Monniot, 1983, *T. palmae* Monniot, 1984, *T. savignii* (Herdman, 1886), and *T. solidum* (Van Name, 1902). *Trididemnum cyanophorum* has larger spicules with smooth rays, more stigmata in each row and more coils of the sperm duct (LAFARGUE & DUCLAUX 1979). *Trididemnum hians* colonies are larger and dark gray in color; zooids are dark green; the muscular process is very long and its base is near the esophageal aperture; more stigmata are present in the first row (MONNIOT 1983). *Trididemnum palmae* has a very different colony shape and size; the oral siphon is short; zooids do not present the muscular process and have fewer sperm duct coils (MONNIOT 1984). *Trididemnum savignii* has larger spicules confined to the upper layer of the tunic and distributed in groups and patches; zooids are larger with a greater number of stigmata in each row and more coils of the sperm duct than the species described here (VAN NAME 1945). *Trididemnum solidum* has a longer muscular process, more coils of the sperm duct and the spicule points have the form of concave-sided cones (VAN NAME 1945) (Tab. I).

Table I. Characters of the Atlantic *Trididemnum* species. (1) Colonies large (L) small (S); (2) spicules dense (D), in low abundance (R) only in the surface (S), only in the base (B); (3) size of the spicules (µm); (4) spicule rays conical (C), concave-sided (CS), blunt tips (B), pointed tips (P); (5) thorax pigmented (P), transparent (T); (6) black spot on the anterior end of the endostyle; (7) number of stigmata per half row; (8) muscular process absent (A), short (S), medium (M), long (L); (9) number of coils of the sperm duct.

Species	1	2	3	4	5	6	7	8	9
<i>Trididemnum maragogi</i>	S	D	55	C, B	T	-	7-9	S	6-7
<i>Trididemnum orbiculatum</i>	S	D, S	40	C, P	P, T	+	9-10	M	8
<i>Trididemnum</i> sp.	?	?	88	C, P	P	?	9-10	S	-
<i>Trididemnum cyanophorum</i>	S	D	80	C, P	?	?	7-11	M	9
<i>Trididemnum hians</i>	S	B	45	C, P	P	+	14	L	7
<i>Trididemnum palmae</i>	L	D	40	C, P	?	?	7-8	A	4-5
<i>Trididemnum savignii</i>	L	R, S	80	C, P	P	-	12	M	12
<i>Trididemnum solidum</i>	L	D	60	CS, P	?	?	10	M	9
<i>Trididemnum cereum</i>	L	R	40	C, P	P	+	8-12	S	7-12
<i>Trididemnum cerebriforme</i>	L	R	80	C, P	P	+	6-10	S	7-8,5

On the Atlantic coast of Africa there are *T. cereum* Lafargue, 1968 in Senegal (LAFARGUE & WAHL 1986) and *T. cerebriforme* Hartmeyer, 1913 in South Africa (MILLAR 1955, 1962) and Namibia (TURON 1988). The former species has a large colony (up to 20 cm in length), more stigmata in each row, more coils of the sperm duct and a very short muscular process close to the endostyle (LAFARGUE 1968). *Trididemnum cerebriforme* has massive colonies, usually folded when large, larger spicules with very regular stellate form, and variably pigmented thoraxes with a black spot on the upper end of the endostyle (MILLAR 1955; TURON 1988) (Tab. I).

In conclusion, *Trididemnum maragogi* is a new species because, among the Atlantic species, it is the only one with the following characteristics: brown colonies more or less covered by spicules, depending on exposure to the sun, which suggests the presence of symbiotic algae; a non pigmented zooid with a very long oral siphon bordered by six finger-like lobes; a branchial sac with anterior and posterior non perforated areas; a short muscular process on the esophageal peduncle; and a testis with one large follicle partially surrounded by 6-7 coils of the sperm duct.

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