

## SPECIES OF *TEREBELLIDES* (POLYCHAETA, TEREBELLIDAE, TRICHOBRANCHINAE) FROM THE BRAZILIAN COAST

André R. S. Garraffoni<sup>1,2</sup>  
Paulo C. Lana<sup>1</sup>

### ABSTRACT

*Terebellides sepultura* sp. nov. is described from the continental shelf bottoms off southern Brazil. *Terebellides carmenensis* Solis-Weiss, Fauchald & Blankensteyn, 1991 is newly recorded for the Brazilian coast and notes on *T. anguicomus* F. Müller, 1858 and *T. klemani* Kinberg, 1867 are provided. A key to 28 species of *Terebellides* is given.

KEYWORDS. Trichobranchinae, *Terebellides*, taxonomy, Brazilian coast.

### INTRODUCTION

The Trichobranchinae, as defined by ROUSE & PLEIJEL (2001), are tube-dwelling surface deposit feeders, occurring predominantly in soft bottoms of shallow waters (IMAJIMA & WILLIAMS, 1985; HUTCHINGS & PEART, 2000). This subfamily has five genera: *Terebellides* Sars, 1835, *Artacamella* Hartman, 1955, *Trichobranchus* Malmgren 1866, *Unobranchus* Hartman, 1965 and *Octobranchus* Marion & Bobretzky, 1875. *Terebellides*, the largest genus, has 34 valid species with worldwide distribution (HOLTHE, 1986; HUTCHINGS & PEART, 2000). The genus is diagnosed by having branchiae as a single mid-dorsal stalked structure on segment 3, with four lobes, notochaeta present from segment 3 to 20 and uncini from segment 8 (neurochaeta on segment 8 acicular and distally bent) to the segment before pigidium.

The genus is poorly known in Brazilian waters. NONATO & LUNA (1970) and SOLIS-WEISS *et al.* (1991) recorded only three species for the region: *T. anguicomus* F. Müller, 1858, *T. klemani* Kinberg, 1867 and *T. lanai* Solis-Weiss, Fauchald & Blankensteyn, 1991.

The aim is to present a taxonomic survey of *Terebellides* species which occur along the Brazilian coast, and a key to the species of the genus.

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1. Centro de Estudos do Mar, Universidade Federal do Paraná, Caixa Postal 50002, 83255-000, Pontal do Sul, Pontal do Paraná, Paraná, Brazil. (agarraffoni@lycos.com; lana@ufpr.br)

2. Pós-Graduação em Zoologia, Departamento de Zoologia, Universidade Federal do Paraná.

### MATERIAL AND METHODS

The study is based on material collected by the REVIZEE program/SCORE SUL, carried out along the southeastern and southern Brazilian continental shelf, and material from Paraná, Rio de Janeiro and Bahia. Samples were taken with a modified van Veen grab (HOLME & MCINTYRE, 1971) and deposited in the Reference Collection of the Centro de Estudos do Mar, Universidade Federal do Paraná, Pontal do Sul (MCEM) and Instituto de Biologia, Universidade Federal do Rio de Janeiro (UFRJ). The material was identified and described according to HOLTHE (1986), SOLIS-WEISS *et al.* (1991), BREMEC & ELIAS (1999) and HUTCHINGS & PEART (2000).

Notochaetae were examined on anterior, mid- and posterior thoracic segments. The dental formula of the neurochaetae refers to the number of tooth rows above the main fang (MF) and the number of teeth in each row (MF:3:4 indicates 2 rows of teeth above the main fang, with 3 and 4 teeth per row, respectively).

#### Key to species of *Terebellides*

*Terebellides pacifica* Kinberg, 1867, *T. koreni* Hansen, 1882, *T. ehlersis* McIntosh, 1885, *T. eurystethus* Chamberlin, 1919, *T. longicaudatus* Hesse, 1917, *T. moori* Hesse, 1917, and *T. williamsae* Zirkov, 1988 were not included, since descriptions are poor or inadequate.

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|---------|---|--|
| 1.      | Presence of a dorsal hump on segment 9 .....  | 2  |
|         | No dorsal hump on segment 9 .....   | 4  |
| 2(1).   | Seventeen thoracic segments with notopodia; first notopodia on segment 4 .....      | <i>T. anguicomus</i> F. Müller, 1858                             |
|         | Eighteen thoracic segments with notopodia; first notopodia on segment 3 .....       | 3  |
| 3(2).   | Both branchial lobes similar in size, segments 3-7 with lateral lappets .....       | <i>T. totae</i> Bretec & Elias, 1999                             |
|         | Ventral branchial lobe slender than dorsal, segments 3-5 with lateral lappets ..... | <i>T. carmenensis</i> Solis-Weiss, Fauchald & Blankensteyn, 1991 |
| 4(1).   | Branchial lobes free for 2/3 of their length .....                                  | 5  |
|         | Branchial lobes fused for up to half their length .....                             | 6  |
| 5(4).   | Five lobed branchiae, lateral lappets on segments 3-5 .....                         | <i>T. klemani</i> Kinberg, 1867                                  |
|         | Four lobed branchiae, lateral lappets on segments 3-7 .....                         | <i>T. sepultura</i> sp. nov.                                     |
| 6(4).   | Notopodia from segment 3 larger than posterior ones .....                           | 7  |
|         | Notopodia from segment 3 shorter or as long as posterior ones .....                 | 8  |
| 7(6).   | Posterior region of the lobes 1 and 2 with papillar projection .....                | <i>T. californica</i> Williams, 1984                             |
|         | Posterior region of the lobes 1 and 2 without papillar projection .....             | <i>T. kobei</i> Hesse, 1917                                      |
| 8(6).   | Posterior region of the lobes 1 and 2 with papillar projections .....               | 9  |
|         | Posterior region of the lobes 1 and 2 without papillar projections .....            | 14   |
| 9(8).   | Lateral lappets on segments 3-5 .....   | 10   |
|         | Lateral lappets on segments 3-7 .....   | 12   |
| 10(9).  | Four lobed branchiae .....  | <i>T. reishi</i> Williams, 1984                                  |
|         | Five lobed branchiae .....  | 11   |
| 11(10). | One type of prostomial tentacles .....  | <i>T. lanai</i> Solis-Weiss, Fauchald & Blankensteyn, 1991       |

	Two types of prostomial tentacles .....	<i>T. woolawa</i> Hutchings & Peart, 2000
12(9).	Four lobed branchiae .....	<i>T. kowinka</i> Hutchings & Peart, 2000
	Five lobed branchiae .....	13
13(12).	Nephridial papillae on segments 3, 6-7 .....	<i>T. narribri</i> Hutchings & Peart, 2000
	Nephridial papillae on segment 3 .....	
	.....	<i>T. parvus</i> Solis-Weiss, Fauchald & Blankensteyn, 1991
14(8).	Acicular uncini on segments 8 and 9 .....	<i>T. intoshi</i> Imajima & Williams, 1985
	Acicular uncini on segment 8 .....	15
15(14).	Acicular uncini with an unusual sheath covering tip .....	16
	Acicular uncini without an unusual sheath covering tip .....	17
16(15).	Branchial lobes free for 2/3 of their length, 34-39 abdominal segments .....	<i>T. distincta</i> Williams, 1984
	Branchial lobes fused for up to half their length, 45-50 abdominal segments .....	
	.....	<i>T. japonica</i> (Moore, 1903)
17(15).	Acicular uncini curved 90° .....	18
	Acicular uncini curved 135° .....	20
18(17).	Acicular uncini with mucronate tips .....	<i>T. brevis</i> Imajima & Williams, 1985
	Acicular uncini without mucronate tips .....	19
19(18).	Anterior notopodia inserted more dorsally compared to posterior ones, notopodia from segment 3 as long as posterior ones .....	<i>T. atlantis</i> Williams, 1984
	Anterior notopodia inserted in line compared to posterior ones; notopodia from segment 3 shorter than posterior ones .....	<i>T. biaciculata</i> Hartmann-Schröder, 1992
20(17).	Segment 3 with conspicuous projection at the level of the notopodia .....	
	.....	<i>T. kobei</i> Hesse, 1917
	Segment 3 without conspicuous projection at the level of the notopodia .....	21
21(20).	Branchial lobes free for 2/3 of their length .....	22
	Branchial lobes fused for up to half of their length .....	25
22(21).	Dorsal branchial lobes much larger than ventral ones .....	23
	Branchial lobes with the same size .....	24
23(22).	Lateral lappets on segments 5 and 6 well developed, acicular uncini curved 135° .....	<i>T. lobatus</i> Hartman & Fauchald, 1971
	Lateral lappets on segments 4 and 5 well developed, acicular uncini curved 90° .....	<i>T. malvinensis</i> Bremec & Elias, 1999
24(22).	Ventrum of segment 6 with a light band, notopodia from segment 3 shorter than posterior ones .....	<i>T. lineata</i> Imajima & Williams, 1985
	Ventrum of segment 6 without a light band, notopodia from segment 3 as long as posterior ones .....	<i>T. mundora</i> Hutchings & Peart, 2000
25(21).	Notopodia from segment 3 as long as posterior ones .....	<i>T. stroemii</i> Sars, 1835
	Notopodia from segment 3 shorter or as long as posterior ones .....	26
26(25).	Segment 4 with conical projection at the level of the notopodia .....	
	.....	<i>T. ypsilon</i> Grube, 1878
	Segment 4 without conical projection at the level of the notopodia .....	27
27(26).	Lateral lappets on segments 3-7 .....	<i>T. horikoshii</i> Imajima & Williams, 1985
	Lateral lappets on segments 3-5 .....	<i>T. bisetosa</i> Hartmann-Schröder, 1965

*Terebellides sepultura* sp. nov.

(Figs. 1-8)

**Etimology.** The species is named to honour Sepultura, the best Brazilian heavy metal band.

**Diagnosis.** Eighteen thoracic segments with notopodia, first notopodia on segment 3. Branchial lobes free for 2/3 of their length. Branchiae four-lobed, with numerous tentacles of similar width.

Buccal tentacles of one type, with expanded tips. Prostomium compact, fused to the peristomial free frontal edge, tentacular membrane compact. Peristomial upper lip hidden, expanded lower lip as an elongate rectangular structure (fig. 1). Eyespots absent. Lateral lappets present on segment 3, distinctly reduced on segments 4 to 7. Nephridial papillae not visible.

Branchiae as a single mid-dorsal stalked structure on segment 3, with four lobes, two large and two small ones, fused basally, made up of loosely fused flat lamellae (fig. 2).

Notopodia 18 pairs, present on segment 3-20. First pair (on segment 3) less developed than posterior ones, with small capillary notosetae. Anterior notopodia laterally inserted, at same level of those from subsequent chaetigers. Neuropodia present from segment 8 to segment before pygidium.

Notochaetae on segment 3 small, reduced in length and number in comparison to notochaetae of the posterior notopodia. Notochaetae similar in structure belonging to two kinds: with single or double wings (fig. 3).

Neuropodial uncini always in a single row. First thoracic neuropodia with 5 retractile distally pointed acicular spines, on segment 8 (chaetiger 6) (fig. 4). Following thoracic neuropodia with long-shafted hooks with dental formula MF:5:4 (figs. 5, 6). Thoracic neuropodia, except for the first, with 5 to 6 uncini per torus; abdominal uncini breviavicular with a dental formula of MF:4-5:5-6, 14-18 per tori (figs. 7, 8). Subrostral process absent.

Segments crowded towards posterior end of the body. Pygidium short and conical. Anus terminal; without blunt papillae. No tube was observed.

**Variation.** One examined specimen (MCEM 1630) has only one branchial lobe. As previously suggested by HUTCHINGS & PEART (2000) for other trichobranchin species, this variation may be a result of lobes being damaged and becoming detached.

**Remarks.** *Terebellides sepultura* resembles *T. klemani* in having branchiae lobes free for 2/3 of their length (figs. 1, 3). *Terebellides sepultura* can be distinguished by the presence of lateral lappets on segments 3-7, four branchiae lobes, a lower number of thoracic uncini per segment, and a single mid-dorsal branchial stalked structure (length up to 1.5 - 2 segments) much larger than in congeneric species (length up to 0.5 - 1 segment) (tabs. I, II).

**Biological data.** Occurs in continental shelf bottoms, between 163 and 350 m in depth, on muddy sediments.

**Type material.** Holotype: off southern Brazilian coast, station 6784, 27°9.51'S, 47°4.85'W, 195 m, specimen complete (MCEM 1623). Paratypes: all off southern Brazilian coast, station 6787, 27°27.83'S, 47°24.22'W, 151 m (MCEM 1624); station 6822, 29°48.5'S, 49°6.80'W, 103 m (MCEM 1625); station 6784, 27°9.51'S, 47°4.85'W, 195 m (MCEM 1626); stations 6780/

6797, 27°7.00'S, 47°44.2'W, 102 m (MCEM 1627); station 6666, 24°17.129'S, 47°12.149'W, 163 m (MCEM 1628); specimens without abdominal part: station 6783, 27°9.90'S, 46°52.83'W, 350 m, (MCEM 1629); station 6813, 29°11.59'S, 47°57.67'W, 299 m, (MCEM 1630), station 6666, 24°17.129'S, 47°12.149'W, 163 m, (MCEM-1631); station 6784, 27°9.51'S, 47°4.85'W, 195 m, specimen broken in three parts (MCEM 1632).

Table I. Characters of species of *Terebellides* from the Gulf of Mexico and from Brazilian and Argentinean coasts.

Species	Nephridial papillae	Hump	Chaetigers with lateral lappets	Dorsal and ventral branchiae lobes	Nº lobes	Acicula shape on seg. 8
<i>T. anguicomus</i>	Present	Segment 9	1-6	Both lobes similar in size	5	Sharply bent, pointed tip
<i>T. carmenensis</i>	Present	Segment 9	1-5	V. lobe slender than d.	5	Gently curved, acute tip
<i>T. klemani</i>	Present	Absent	1-3	Both lobes similar in size	5	Gently curved, acute tip
<i>T. lanai</i>	Present	Absent	1-8	V. lobe slender than d.	5	Sharply bent, pointed tip
<i>T. malvinensis</i>	?	Absent	1-5	V. lobe slender than d.	5	Sharply bent, pointed tip
<i>T. parvus</i>	Present	Absent	?	Both lobes similar in size	5	Sharply bent, pointed tip
<i>T. totae</i>	?	Segment 9	1-6	Both lobes similar in size	5	Gently curved, acute tip
<i>T. sepultura</i>	Not visible	Absent	1-5	V. lobe slender than d.	4	Sharply bent, pointed tip

### *Terebellides carmenensis* Solis-Weiss, Fauchald & Blankensteyn, 1991

(Figs. 9, 10)

*Terebellides carmenensis* SOLIS-WEISS *et al.*, 1991:151, fig. 1j-m; HUTCHINGS & PEART 2000:244, 248, tabs. 3a, b.

*Terebellides klemani*; HERNÁNDEZ-ALCANTARA & SOLIS-WEISS, 1991:457, tab.2.

Remarks. The specimens analyzed in this study closely resemble the original description provided by SOLIS-WEISS *et al.* (1991). Their main diagnostic features are the presence of a dorsal hump on segment 9, notopodia of segment 3 smaller than posterior ones, acicular uncini on segment 8 (chaetiger 6) sharply bent and with a pointed tip, and branchial lobes fused for most of their length. Specimens from the Brazilian coast differ from the original description of *Terebellides carmenensis* only in number of thoracic and abdominal neurochaetae. SOLIS-WEISS *et al.* (1991) described 12 thoracic long-handled neurochaetae and 45-48 abdominal neurochaetae in the holotype (39-54 in the paratypes), whereas specimens from the northeastern Brazilian coast have 10-12 thoracic neurochaetae with long-handled hooks and 25-35 abdominal neurochaetae (figs. 9, 10), most probably as a result of intraspecific variation. This species is new to the Brazilian marine fauna.

Biological data. In shallow waters associated with mangrove vegetation (SOLIS-WEISS *et al.*, 1991), and coral reefs.

Distribution. Isla de Carmen, Campeche (Mexico); Recife das Paredes, and Recife da Lixa, Bahia State (Brazil).

Material examined. BRAZIL, **Bahia**: 2 specimens, 17°59.763'S, 39°16.356'W, 5 a 9m, 19.II.2000, P. C. Paiva col. (UFRJ 331); 2 specimens, 17°45.127'S, 38°58.720'W, 8 m, 25.II.2000, P. C. Paiva col. (UFRJ 332).

Table II. Characters of species of *Terebellides* from the Gulf of Mexico and from Brazilian and Argentinean coasts. References: (1) SOLIS-WEISS *et al.* (1991); (2) BREMEC & ELIAS (1999).

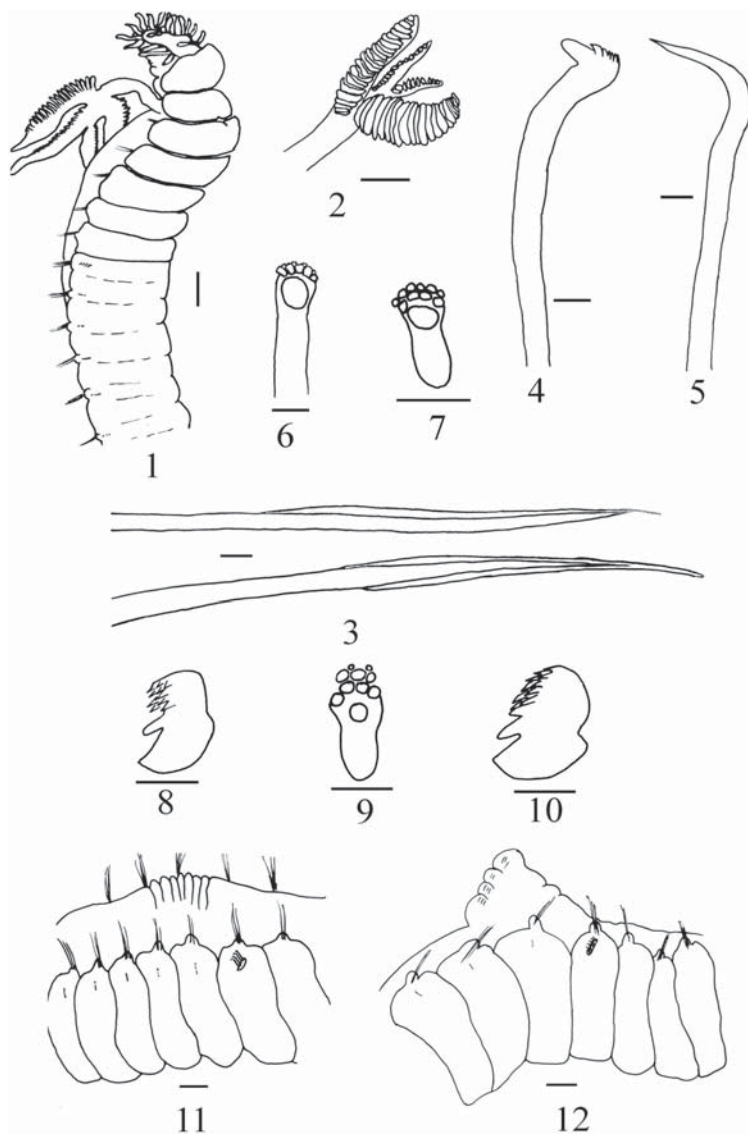
Species	Notopodia on seg. 3	N° thoracic uncini per torus	N° teeth rows in abdominal uncini	N° abdominal uncini per torus	N° abdominal chaetigers	Type locality, depth and reference
<i>T. anguicomus</i>	Absent	6-8	2	19-49	40-42	Paranaguá Bay, 25°29'48"S, 48°29'30"W, 16 m (1)
<i>T. carmenensis</i>	Smaller than posterior	12	?	39-54	37	San Julian, Isla de Carmen, Mexico, intertidal (1)
<i>T. klemani</i>	Smaller than posterior	10-14	?	35	30-32	Atlantic Ocean 22°30'S, 40°55'W, 36-73 m (1)
<i>T. lanai</i>	Smaller than posterior	8-10	3	25-29	38	Brazilian coast 24°16'S, 46°01'02"W, 45 m (1)
<i>T. malvinensis</i>	Similar than posterior	9-10	?	40	?	Argentinean coast 38°44'S, 56°13'W, 87m (2)
<i>T. parvus</i>	Smaller than posterior	12	2	18-37	25	West Bay, Twin Cays, Belize, 10-50 m (1)
<i>T. totae</i>	Smaller than posterior	8-17	?	23-27/ 59-72	39	Blanca Bay, Argentina, 38°54'00"S, 62°11'50"W, 20 m (2)
<i>T. sepultura</i>	Smaller than posterior	5-6	2	14-17	28-29	off southern Brazilian coast, 27°9.51'S, 47°4.85'W, 195 m

### *Terebellides anguicomus* F. Müller, 1858

(Figs. 11, 12)

*Terebellides anguicomus* MÜLLER, 1858:218, pl. 7, figs. 22-25; HESSLE, 1917:141, fig. 33a-c (in part); NONATO & LUNA, 1970:97; SOLIS-WEISS *et al.*, 1991:149, figs. 1g-i; HUTCHINGS & PEART, 2000:244, table 3a, b.

Remarks. The examined specimens closely resemble the neotype designated by SOLIS-WEISS *et al.* (1991) (United State Nacional Museum 131996), collected in Paraná State. These authors stated that the species has a "dorsum with a large, transversely oriented hump on setiger 5". In the present specimens and in the illustration of the neotype description (SOLIS-WEISS *et al.*, 1991:150, fig. 1g) a dorsal hump is clearly present on segment 9 (chaetiger 7), probably on account of a



Figs. 1-12. *Terebellides sepultura* sp. nov.: 1, anterior part of body, lateral view (holotype, MCEM 1623); 2, branchia with 4 lobes, ventral. Paratype, MCEM 1632; 3, two kinds of notochaeta from the anterior part of thorax of the same segment; 4, thoracic neurochaeta, lateral; 5, thoracic neurochaeta, frontal; 6, neurochaeta on segment 8; 7, 8, abdominal uncinus: 7, lateral; 8, frontal. *T. carmenensis* Solis-Weiss, Fauchald & Blankensteyn, 1991: 9, abdominal uncinus, frontal view; 10, abdominal uncinus, lateral view. *T. anguicomus* F. Müller, 1858: 11, lateral view of anterior part of dead specimen; 12, lateral view of anterior part of alive specimen. Scale bars: figs. 1, 2, 11, 12, 0.2 mm; 3-5, 7-10, 9  $\mu$ m; 6, 22.2  $\mu$ m.



misunderstanding of the numbering of anterior segments, which then modifies the notation of all subsequent segments. We had the opportunity to examine live specimens and to check that the size of this dorsal hump can vary between live and fixed specimens (figs. 11,12). The three species that present the dorsal hump, *Terebellides anguicomus*, *T. carmenensis* and *T. totae*, have this structure on segment 9 (chaetiger 7). SOLIS-WEISS *et al.* (1991) also stated that “the nephridial papillae are in a groove medial to rudimentary parapodia of segment 2, close to branchial base”. The specimens studied herein have nephridial papillae on segment 3, the same segment of the branchial base.

Biological data. In shallow waters on silty and sandy sediments and coral reefs.

Distribution. Brazil: from Sergipe to Santa Catarina states.

Material examined. BRAZIL, **Bahia**: Recife da Lixa, 2 specimens, 17°45.127'S, 38°58.720' W, 8m, 25.II.2000, P. C. Paiva col. (UFRJ 334); Recife das Paredes, 2 specimens, 17°59.763' S, 39°16.356' W, 5 a 9m 19.II.2000, P. C. Paiva col. (UFRJ 335). **Paraná**, Baía de Paranguá, 4 specimens, 09.I.86, Blankensteyn col. (MCEM 328).

### *Terebellides klemani* Kinberg, 1867

*Terebellides klemani* KINBERG, 1867:346; HARTMAN, 1948:14; SOLIS-WEISS *et al.*, 1991: 148, figs. 1a-f; HUTCHINGS & PEART, 2000:244, 248, tabs. 3a, b.  
*Terebellides anguicomus*; HESSLE, 1917:141, figs. 33a-c (in part, not *T. anguicomus* MÜLLER, 1858).

Remarks. *Terebellides klemani* was synonymized with *T. anguicomus* by HESSLE (1917). The two species are currently considered valid (SOLIS-WEISS *et al.*, 1991). *Terebellides klemani* differs from *T. anguicomus* by the absence of a dorsal hump on segment 9, notopodia on segment 3, and free branchial lobes. The animals collected in this study closely agree with the description provided by SOLIS-WEISS *et al.* (1991).

Biological data. In shallow waters on muddy or sandy sediments (SOLIS-WEISS *et al.*, 1991) and coral reefs.

Distribution. Brazil: from Alagoas to Santa Catarina states.

Material examined. BRAZIL, **Bahia**: 4 specimens, 17°45.127'S, 38°58.720'W, 8m, 25.II.2000, P. C. Paiva col. (UFRJ 333).

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