

A new species of *Trypanosyllis* (Polychaeta: Syllidae) from Brazil, with a redescription of Brazilian material of *Trypanosyllis zebra*

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A new species of Trypanosyllis was found in a collection of polychaetes living on algae, sponges, ascidians and sabelariid reefs at the intertidal zone of a rocky shore, at Praia do Guaraú, south-eastern Brazil. Trypanosyllis aurantiacus sp. nov., is characterized by having an orange body in life, with dark red antennae and cirri throughout, falcigers with short, sub-bidentate blades, and parapodia with thick, distally sharp, protruding aciculae, two to three aciculae on each anterior parapodium, two aciculae on midbody segments, single acicula per parapodium on posteriormost chaetigers. Trypanosyllis aurantiacus sp. nov., is compared with the most similar congeners and a redescription of Trypanosyllis zebra, based on Brazilian specimens collected from similar environments at nearby beaches, is given.

Keywords: new species, polychaetes, Brazil, *Trypanosyllis zebra*

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INTRODUCTION

Trypanosyllis Claparède, 1864 is an easily recognizable genus of syllid polychaetes, characterized by the flattened, ribbon-like shape of the body, frequently conspicuously coloured, with one to two transverse red to dark bars per segment and antennae, peristomial and all dorsal cirri ranging from red to purple.

The genus counts on more than 20 species currently known, living on hard substrates, such as rocks, stony corals and algae, and has been reported worldwide (San Martín, 2003). The type-species, *Trypanosyllis zebra* (Grube, 1860) has been recorded throughout the Atlantic, and San Martín (2003) suggested it may have a cosmopolitan distribution, as some species described from the Caribbean, Red Sea and Pacific Ocean are possible synonyms, or represent a mix of sibling species.

In Brazil, *T. zebra* has been recorded from the states of Bahia and Pernambuco (Rullier & Amoureux, 1979), in the north-eastern region, and Rio de Janeiro (Attolini, 1997) and São Paulo (Morgado & Amaral, 1985; Duarte & Nalesso, 1996; Nogueira, 2000), in the south-eastern region. In addition, *T. zebra* has been a common species in our collections of polychaetes living on algae, sponges, ascidians and sabelariid reefs at the intertidal zone of rocky shores along the coast of the state of São Paulo. *Trypanosyllis vittigera* Ehlers, 1887 was recently recorded from the states of Bahia and Rio de Janeiro (Paiva, 2006), but this species is a synonym of *T. zebra* (Aguado *et al.*, 2008).

More recently, in a collection from Praia do Guaraú, the southernmost beach of the state of São Paulo we have

sampled until present, a different, new to science species of *Trypanosyllis* was found. This species differs from *T. zebra* in body pigmentation, in having sub-bidentate falcigers and fewer rows of proventricular muscle cells.

In the present paper we describe this new species and provide a redescription of *T. zebra* based on our specimens. This redescription is given not only for a matter of comparison with the new species described herein, but especially because *T. zebra* has been reported in many localities distant from the type-locality, often with no descriptions, and since its holotype, originally deposited at the Museum für Naturkunde of Berlin, was destroyed during World War II (anonymous referee, personal communication), it is difficult to evaluate whether this is really a cosmopolitan species, or another case of a complex of sibling species. Future molecular studies could be of help to elucidate this issue.

MATERIALS AND METHODS

The material for the present study came from two independent projects in which we are engaged. The first one is the project 'Benthic Marine Biodiversity in the State of São Paulo' and our participation is restricted to the identification of material previously collected. The second one is the project 'Biodiversity of Intertidal Polychaetes (Annelida: Polychaeta) on Rocky Shores off the State of São Paulo', which is being conducted by the Laboratório de Poliquetologia, IB-USP.

The material from the project 'Benthic Marine Biodiversity in the State of São Paulo' was received already sorted to family and preserved in 70% ethanol. Details on the collection of that material are available at the website http://www.ib.unicamp.br/projbiota/bentos_marinho/index.htm (Amaral, 2001).

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For the project 'Biodiversity of Intertidal Polychaetes (Annelida: Polychaeta) on Rocky Shores off the State of São Paulo', collections were made at low tide, on rocky shores off the cities of Ubatuba (Praia do Félix, Praia do Perequê Mirim and Praia de Domingas Dias), Caraguatatuba (Praia de Martim de Sá), São Sebastião (Praia de São Francisco, Praia da Baleia, Barra do Una, Praia do Araçá, Praia Preta, Praia de Barequeçaba, Praia de Guaecá and Praia de Toque-toque Grande), Guarujá (Praia Branca and Praia de Pernambuco), Santos (Ilha das Palmas), São Vicente (Ilha Porchat and Praia das Vacas), Itanhaém (Praia do Sonho) and Peruíbe (Praia do Guaraú).

The rocky shores were sampled by scraping the rocks to extract small amounts of tufts of algae, colonies of sponges, small pieces of sabellariid reefs and ascidians. The material was studied alive under a stereomicroscope, polychaetes were sorted, relaxed in menthol solution, fixed in 4% formaldehyde, then washed and stored in 70% ethanol.

Further analysis under stereo- and light microscopes were made from specimens and detached parapodia permanently mounted on slides in glycerine jelly, in the case of *Trypanosyllis zebra*, or polyvinyl-lactophenol (PVLPL), in the case of *T. aurantiacus* sp. nov. For the examination under SEM, one specimen of *T. zebra* and two specimens of *T. aurantiacus* sp. nov., were critical point dried and covered with 25 nm of gold. *Trypanosyllis zebra* was examined at the Laboratório de Microscopia Eletrônica, Instituto de Biologia, Universidade Estadual de Campinas (UNICAMP), and *T. aurantiacus* sp. nov. was examined at Laboratório de Microscopia Eletrônica, Museu de Zoologia, Universidade de São Paulo (MZUSP).

Photographs under light microscope were taken with an Olympus C-7070 digital camera attached to an Olympus BX51 microscope and edited with Adobe Photoshop CS software.

Type material is deposited at the MZUSP, Brazil, and the Zoological Museum of the University of Copenhagen (ZMUC), Denmark. Specimens observed under SEM are deposited in the collection of the Laboratório de Poliquetologia, IB-USP, but were not allocated collection numbers.

SYSTEMATICS

Family SYLLIDAE Grube, 1850
Subfamily SYLLINAE Grube, 1850
Genus *Trypanosyllis* Claparède, 1864

TYPE-SPECIES

Syllis zebra Grube, 1860, designated by Claparède (1864).

DIAGNOSIS

Medium to large sized syllines, up to 13 cm long, with nearly 500 segments, with flattened, ribbon-like body. Prostomium with three antennae, two pairs of eyes, sometimes with one pair of anterior eyespots, and one pair of short, oval, completely separated palps. Antennae, peristomial cirri, dorsal cirri throughout and anal cirri moniliform. Peristomium usually dorsally reduced, with two pairs of peristomial cirri. Parapodia with compound chaetae, sometimes secondarily simple due to fusion between shaft and blade; dorsal and/or

ventral simple chaetae present sometimes, on posteriormost parapodia. Pharynx with an anterior trepan, a central, larger tooth may also be present. Reproduction by budding *Tetraglene*-type stolons.

REMARKS

Trypanosyllis was split into four subgenera based on the presence of a central pharyngeal tooth in addition to the trepan, on the presence of long cirrophores on dorsal cirri, and on the morphology of chaetae, if compound or secondarily simple (Imajima & Hartman, 1964).

According to this classification, *Trypanosyllis* (*Trypanosyllis*) Claparède, 1864 has a pharynx armed with a terminal trepan, usually with 10 small teeth, and a subdistal mid-dorsal tooth, and chaetae as compound falcigers only. *Trypanosyllis* (*Trypanedenta*) Imajima & Hartman, 1964 is similar to *Trypanosyllis* (*Trypanosyllis*), but lacks a mid-dorsal pharyngeal tooth. *Trypanosyllis* (*Trypanobia*) Imajima & Hartman, 1964 also lacks a mid-dorsal pharyngeal tooth and, in addition, it has dorsal cirri throughout with long cirrophores and all chaetae secondarily simple. Finally, *Trypanosyllis* (*Trypanoseta*) Imajima & Hartman, 1964 was characterized by having a cylindrical body, not dorsoventrally depressed as found in the other three subgenera, possessing a trepan with 10 teeth and a mid-dorsal tooth in the pharynx, and only simple chaetae throughout.

This classification was questioned by San Martín (1984), who stated that the presence of a mid-dorsal pharyngeal tooth is frequently dependent on the ontogenetic status of the animal, with such tooth present in juveniles, but not in adults. In regards to *Trypanobia*, San Martín (1984) suggested it should be raised to genus level. Except for Kudenov & Harris (1995), subsequent authors (Uebelacker, 1984; Nogueira, 2000; San Martín, 2003) have followed San Martín's suggestion and the division of *Trypanosyllis* into subgenera has not been adopted. Furthermore, Imajima (1966) raised *T. (Trypanoseta)* to the category of genus, naming it *Geminosyllis* Imajima, 1966.

Trypanosyllis zebra (Grube, 1860)
(Figure 1)

Syllis zebra Grube, 1860: 86, pl. 3, figure 7

Trypanosyllis zebra. Fauvel, 1923: 269, figure 101a–e; Day, 1967: 256, figure 12.6a–b; Gardiner, 1975: 138, figure 12f–h; Rullier & Amoureux, 1979: 162; San Martín, 1984: 277, lâms 64–65; 2003: 311, figures 171–173; Nuñez, 1990: 357, figure 109; Nogueira, 2000: 91, figure 22a–f.

Trypanosyllis taeniaformis. Westheide, 1974: 231: abb. 16; Morgado & Amaral, 1985: 222.

Trypanosyllis (Trypanedenta) taeniaformis. Imajima, 1966: 239, figure 45; Ben-Eliahu, 1977: 48.

MATERIAL EXAMINED

'Biodiversity of Intertidal Polychaetes (Annelida: Polychaeta) on Rocky Shores off the State of São Paulo'. Ubatuba–Praia do Félix (23°23'S 44°58'W): 9 spec, 4 November 2002 (MZUSP 596); Praia de Perequê-Mirim (23°29'S 45°06'W): 1 spec, 5 January 2003 (ZMUC Pol-1948); Praia de

Domingas Dias (23°30'S 45°08'W): 1 spec, 22 July 2002; 1 spec, 2 November 2002. São Sebastião–Praia de São Francisco (23°44'S 45°24'W): 1 spec, 19 April 2003 (MZUSP 597); Praia do Araçá (23°49'S 45°24'W): 1 spec, 3 November 2002; 1 spec, 25 September 2003 (MZUSP 600); Praia Preta (23°49'S 45°25'W): 4 specs, 18 April 2003 (ZMUC Pol-1949); 3 specs, 18 July 2003 (MZUSP 599); Praia de Guaecá (23°49'S 45°28'W): 1 spec, 17 July 2003 (MZUSP 598). Guarujá–Praia Pernambuco (23°58'S 46°10'W): 2 specs, 22 June 2005 (ZMUC Pol-1952). Santos–Ilha das Palmas (24°00'S 46°19'W): 3 specs, 6 March 2004 (ZMUC Pol-1951). São Vicente–Ilha Porchat (23°59'S 46°22'W): 2 specs, 15 June 2003 (ZMUC Pol-1950); 1 spec, 9 December 2003 (MZUSP 601).

'Project Benthic Marine Biodiversity in the State of São Paulo', Ubatuba–Ilha dos Porcos Pequena (23°23'S 44°56'W): 4 specs, 18 October 2001 (ZMUC Pol-1947).

Caraguatatuba–Ponta do Cambiri (23°37'S 45°23'W): 1 spec, 9 May 2001; 3 specs, 17 October 2001 (MZUSP 595). São Sebastião–Praia da Baleia (23°46'S 45°39'W): 4 specs, 8 April 2001 (MZUSP 594); Praia de Toque–Toque Grande (23°50'S 45°30'W): 2 specs, 10 April 2001 (ZMUC Pol-1946).

COMPARATIVE MATERIAL EXAMINED

São Sebastião–Ilha dos Alcatrazes, Baía do Oratório (24°06'S 45°42'W): 5 species, 4 December 1996, in colonies of the stony coral *Mussismilia hispida* (Verrill, 1868). Santos–Laje de Santos (24°05'S 46°17'W): 5 species, 17 March 1996, in colonies of the stony coral *Mussismilia hispida*.

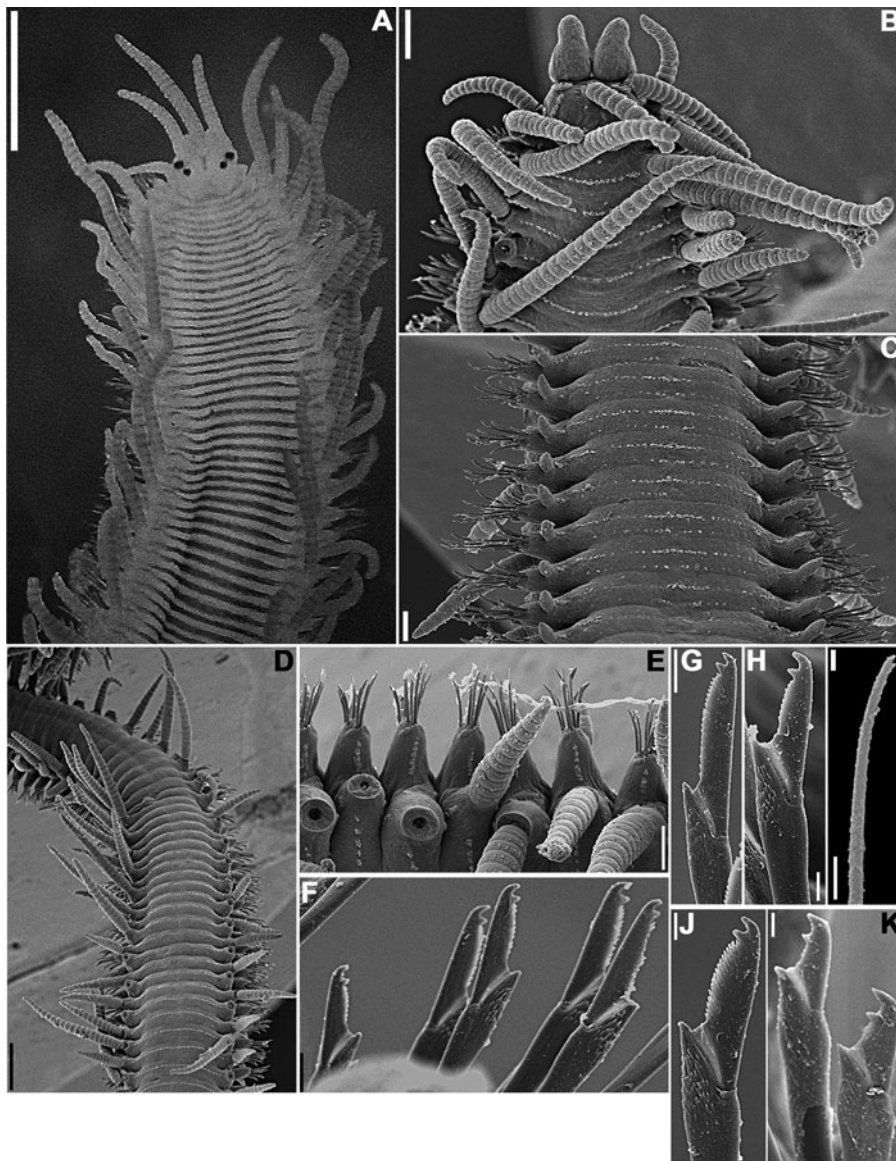


Fig. 1. *Trypanosyllis zebra* (A) MZUSP 597; (B–K) discarded specimen. (A) Live specimen, anterior end, dorsal view; (B) anterior end, dorsal view; (C) midbody segments, ventral view; (D) midbody segments, dorsal view; (E) midbody parapodia; (F) falcigers, midbody parapodium; (G) superior falciger, anterior parapodium; (H) inferior falciger, anterior parapodium; (I) dorsal simple chaeta; (J) superior falciger, midbody parapodium; (K) inferior falcigers, posterior parapodium. Scale bars: A, 500 μ m; B, 150 μ m; C, E, 100 μ m; D, 400 μ m; F, G, 10 μ m; H, J, K, 5 μ m; I, 4 μ m.

Table 1. Variation among the specimens of *Trypanosyllis zebra* examined for the present study ('?' was attributed when the condition of the specimen did not allow to see that character; '-' was attributed when that particular structure was absent in that specimen). Specimens 1–3: Laje de Santos (24°05'S 46°17'W), 17 March 1996; specimen 3 budding female epitokous; specimen 4: Praia da Baleia (23°46'S 45°39'W), 8 April 2001; specimen 5: Ponta do Cambiri (23°37'S 45°23'W), 9 May 2001; specimen 6 (MZUSP 596): Praia do Félix (23°23'S 44°58'W), 4 November 2002; specimen 7 (MZUSP 596): Praia do Félix (23°23'S 44°58'W), 4 November 2002; specimen 8: Praia Domingas Dias (23°30'S 45°08'W), 22 July 2002.

	Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5	Specimen 6	Specimen 7	Specimen 8
Total length × width at proventricle (mm); number of chaetigers	22.8 × 0.9; 167	32.2 × 0.9; 161 (incomplete)	22.7 × 1.12; 142 Epitokous (♀): 3.85 × 1.12; 24	11.6 × 0.94; 116	11.4 × 0.75; 77 (incomplete)	11.75 × 0.88; 101	7.4 × 0.49; 85	6.38 × 0.48; 70
Length of pharynx (number of chaetigers)	14	8	11.5	6	9.5	13	8	7
Pharyngeal central tooth	Absent	Absent	Present	Present	Absent	Absent	Absent	Absent
Length of proventricle (chaetigers) × no. of rows of muscle cells	9; ?	10; ?	11; 36	12; 40	9; 40–43	9; ?	6; 38	7.5; 38
Dorsal and ventral simple chaetae beginning from, respectively (chaetiger)	164 (?), –	–, –	–, –	112, 93	–, –	95, 88	–, –	69, 59
Number of articles of central × lateral antennae	21 × 19	25 × 18	? × ?	12 × 10	– × –	22 × 14	15 × 11	15 × 11
Number of articles of dorsal × ventral peristomial cirri	20 × 12	29 × 17	25 × ~11	18 × 9	– × –	29 × 13	17 × ?	16 × 10
Number of articles of dorsal cirri on chaetiger 1, long cirri on midbody, short cirri on midbody, long cirri on posterior body, short cirri on posterior body, and anal cirri	19, 19–23, 12–14, 12–16, 8–9, 17	48, 21–24, 13–17, 18, 10, –	–, 17–35, 12–20, 17–20, 12–15 (epitokous: 9), –	25, 17, 11, 10, 5–8, 14	–, 14–16, 9–12, 14–16, 9–12, –	?, 16–18, 10–12, 16–18, 10–12, 12	13, 17, 12, 10, 9, 13	22, 10–12, 6–8, 7–9, 5–6, 11
Number of falcigers per parapodium on anterior, midbody and posterior chaetigers	10, 7–8, 6–8	11, 9, 6–8	10–12, 10, 8–10 (epitokous: 6–8)	9–11, 5–7, 4–6	9–11, 8–9, 7	9, 7, 5	8–10, 7–8, 4–7	7–8, 6–8, 4–5
Length of blades of falcigers on anterior, midbody and posterior chaetigers (µm)	37–27, 35–25, 27–17	45–32, 35–22, 32–22	45–25, 35–22, 32–25 (epitokous: 30–22)	40–27, 35–25, 22–17	35–22, 32–22, 27–20	37–25, 32–20, 25–20	30–17, 22–17, 20–15	27–28, 25–15, 18–12
Number of posterior achaetous segments	7	–	–	13	–	10	3	9

DESCRIPTION

Brazilian specimens with up to 170 chaetigers and measuring up to 32 mm in length and 1.12 mm in width, at proventricular level. Large specimens with characteristic pigmentation, as two transverse dark bars per segment, and antennae, peristomial cirri, dorsal cirri throughout and anal cirri dark red (Figure 1A). Prostomium small, dorsally bilobed, with two pairs of eyes in trapezoidal arrangement; palps shorter than prostomium, kidney-shaped; lateral antennae with 14–19 articles, originating frontally, at anterior border of prostomium, central antenna longer, with 21–25 articles, originating dorsally on prostomium, close to anterior border (Figure 1A,B; Table 1). Peristomium dorsally reduced; dorsal pair of peristomial cirri with up to 29 articles, ventral pair with 9–17 articles (Table 1). Ventrally, segments throughout with two transverse ciliated bands each, one band at midlength of segment, other band less conspicuous,

close to posterior border of segment (Figure 1C); dorsally, segments with one conspicuous ciliated band at midlength, continuing to parapodial lobes (Figure 1B,D&E). Dorsal cirri throughout long, distally pointed, those on segment 1 slightly longer than following cirri, usually with ~25 articles, but specimens with dorsal cirri on chaetiger 1 with up to 48 articles were studied (Figure 1A–E; Table 1); from chaetiger 10 onwards, dorsal cirri alternating long and short, long cirri with 14–35 articles until midbody, 6–20 articles on posterior segments, short cirri with 7–20 articles on anterior and midbody parapodia (Figure 1A,B,D&E), 5–15 articles on posterior segments (Table 1). Ventral cirri short, digitiform, not exceeding length of parapodial lobes (Figure 1C). Anterior parapodia with 7–11 compound chaetae each, 7–10 chaetae per parapodium at midbody, 4–8 chaetae per parapodium on posterior chaetigers (Table 1). Compound chaetae as bidentate falcigers, with teeth about same size and rounded space in between; on anterior segments, blades with

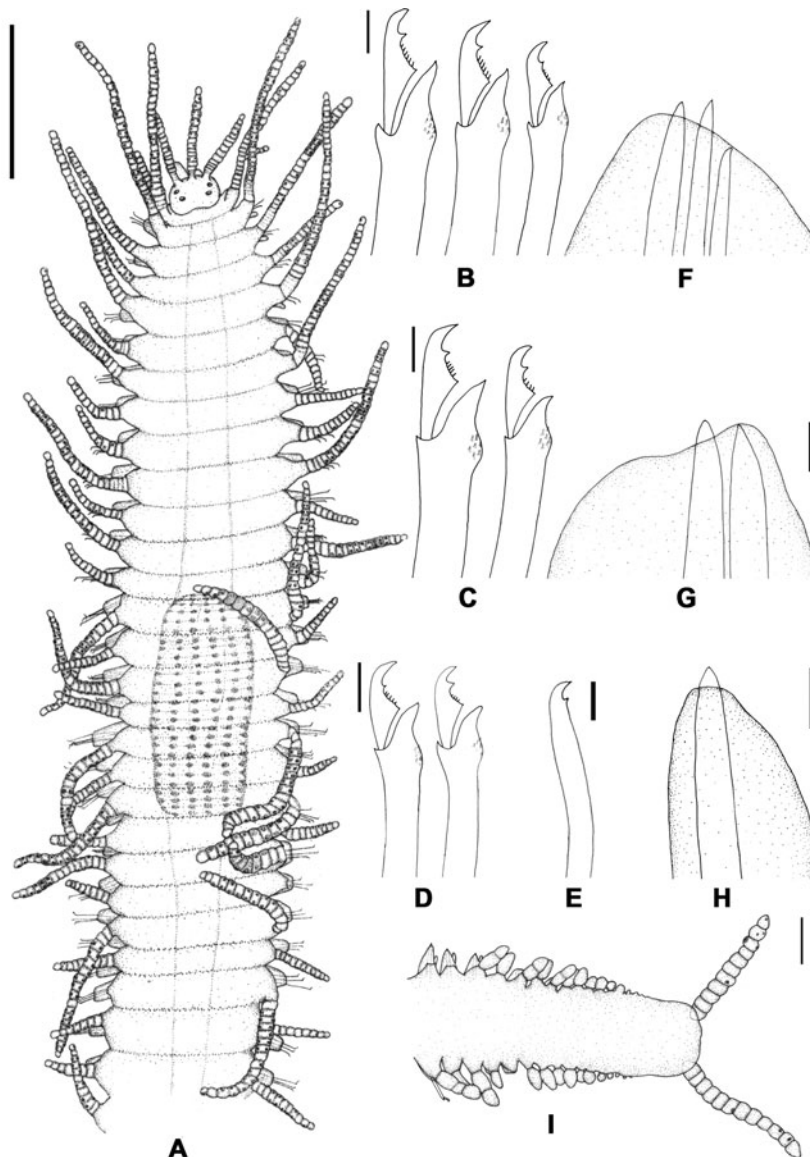


Fig. 2. *Trypanosyllis aurantiacus* sp. nov. (A–H) holotype (MZUSP 589); (I) paratype 2 (MZUSP 591). (A) Anterior end, dorsal view; (B) falcigers, anterior parapodium; (C) falcigers, midbody parapodium; (D) falcigers, posterior parapodium; (E) ventral simple chaeta; (F) aciculae, anterior parapodium; (G) aciculae, midbody parapodium; (H) acicula, posterior parapodium; (I) posterior end, dorsal view. Scale bars: A, 500 μ m; B–D, F–H, 10 μ m; E, 5 μ m; I, 150 μ m.

dorsoventral gradation in length, measuring $\sim 45\text{--}22\ \mu\text{m}$ (Figure 1F–H; Table 1); blades shorter from midbody, with less conspicuous dorsoventral gradation in length, measuring $\sim 35\text{--}22\ \mu\text{m}$ on midbody parapodia (Figure 1J; Table 1), $\sim 32\text{--}12\ \mu\text{m}$ on posterior parapodia (Figure 1K; Table 1). Dorsal and ventral simple chaetae only present on posteriormost chaetigers, dorsal simple chaetae thin, distally bidentate (Figure 1L), beginning posteriorly to beginning of ventral simple chaetae; ventral simple chaetae sigmoid, about as thick as shafts of falcigers, distally bidentate, with distal tooth larger than subdistal tooth, similar to blades of falcigers. Anterior parapodia with up to 4 aciculae each, aciculae thick, one of them slightly irregularly curved distally, remaining aciculae straight, distally sharp; 2–3 aciculae on each midbody parapodium, 1–2 aciculae on posterior parapodia; longest 1–2 aciculae on each parapodium sharper, protruding from parapodial lobe. Body terminating by one pair of anal cirri with 13–17 articles (Table 1). Pharynx extending for 6–14

segments, with anterior trepan with about 10 sharp teeth, and, sometimes, a large, triangular, central tooth (Table 1); proventricle extending through 6–12 segments, with ~ 40 rows of muscle cells (Table 1).

REMARKS

Trypanosyllis zebra is known to occur throughout the Atlantic, from the English Channel to South Africa and also in the Mediterranean. According to San Martín (2003), it is possibly a cosmopolitan species. However, very few descriptions of specimens from different localities are available in the literature, making it difficult to make comparisons between specimens from different parts of the world and evaluate whether this is a single species or a complex of sibling species. In addition, the holotype is lost (anonymous referee, personal communication).

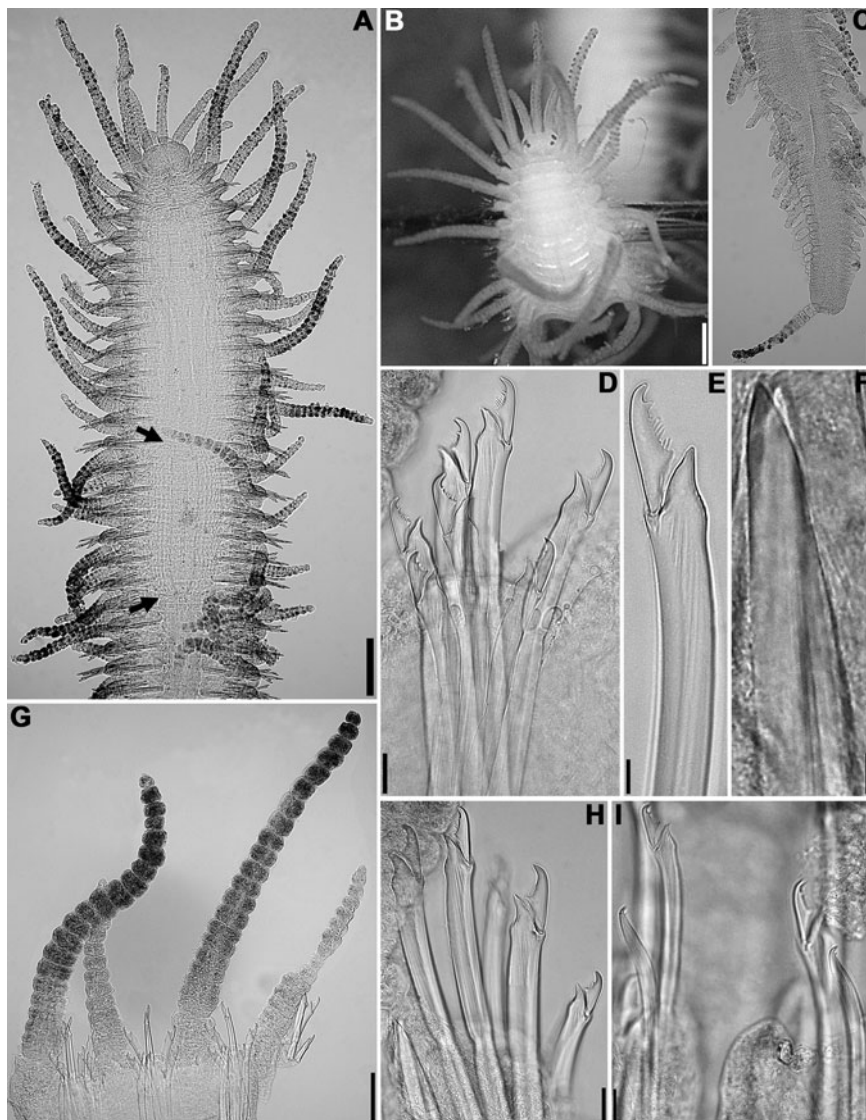


Fig. 3. *Trypanosyllis aurantiacus* sp. nov. (A, C) holotype (MZUSP 589); (B) paratype 5 (ZMUC Pol 1943); (D–I) slide mounted detached parapodia, paratype 4 (MZUSP 593). (A) Anterior end, dorsal view, slide mounted specimen, arrows point to beginning and ending of proventricle; (B) anterior end, dorsal view, recently preserved specimen; (C) posterior end, dorsal view, slide mounted specimen; (D, E), falcigers, anterior parapodium; (F) aciculae, midbody parapodium; (G) midbody parapodia; (H) chaetae and aciculae, midbody parapodium; (I) ventral simple chaetae and inferior falcigers, posterior parapodia. Scale bars: A–C, 250 μm ; D, 20 μm ; E, I, 10 μm ; F, 7 μm ; G, 50 μm .

Our material matches the description by San Martín (2003) and therefore we consider the Brazilian specimens as belonging to the same species as those from Spain.

Trypanosyllis aurantiacus sp. nov.
(Figures 2–6)

MATERIAL EXAMINED

'Biodiversity of Intertidal Polychaetes (Annelida: Polychaeta) on Rocky Shores off the State of São Paulo'. Peruíbe–Praia do Guaraú (24°22'S 47°01' W): 23 specs, 5 March 2007.

Type series. Holotype and 4 paratypes deposited at MZUSP, all slide mounted specimens (holotype: MZUSP 589; paratypes: MZUSP 590–593), 3 paratypes deposited at ZMUC (ZMUC Pol 1943–1945). Holotype (MZUSP 589): 113 chaetigers,

10 mm long, 0.6 mm wide; paratype 1 (MZUSP 590): 119 chaetigers, 9.48 mm long, 0.65 mm wide; paratype 2 (MZUSP 591): 66 chaetigers, 5.17 mm long, 0.45 mm wide; paratype 3 (MZUSP 592): 85 chaetigers, 7.25 mm long × 0.57 mm wide; paratype 4 (MZUSP 593): 88 chaetigers; ~11 mm long, 0.7 mm wide, posteriorly budding stolons; paratype 5 (ZMUC Pol 1943): 71 chaetigers (plus posterior achaetous zone of ~10 segments), ~8.2 mm long, 0.5 mm wide; paratype 6 (ZMUC Pol 1944): ~110 chaetigers, ~14 mm long, 0.9 mm wide, posteriorly budding stolons; paratype 7 (ZMUC Pol 1945): ~100 chaetigers, ~13 mm long, 0.7 mm wide, posteriorly budding stolons.

DESCRIPTION

Holotype, with 113 chaetigers, measuring 10 mm in length, 0.6 mm in width, at proventricular level. In life, body

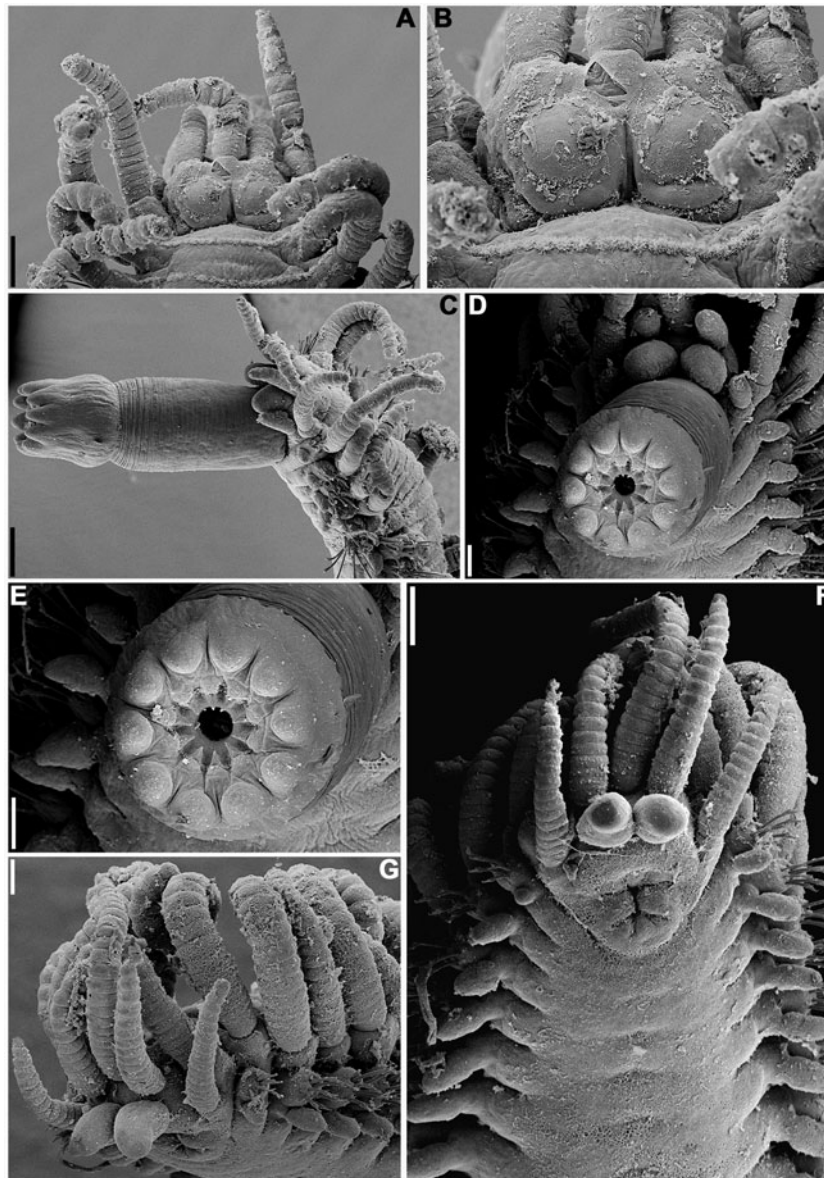


Fig. 4. *Trypanosyllis aurantiacus* sp. nov. (A–E) specimen 1; (F–G) specimen 2. (A) Anterior end, dorsal view; (B) detail, anterior end, dorsal view; (C) anterior end, lateral view (pharynx everted); (D) anterior end, ventral view (pharynx everted); (E) detail, pharynx opening; (F) anterior end, ventral view; (G) anterior end, antero-lateral view. Scale bars: A, 90 μ m; B, 30 μ m; C, 150 μ m; D, E & G, 60 μ m; F, 150 μ m.

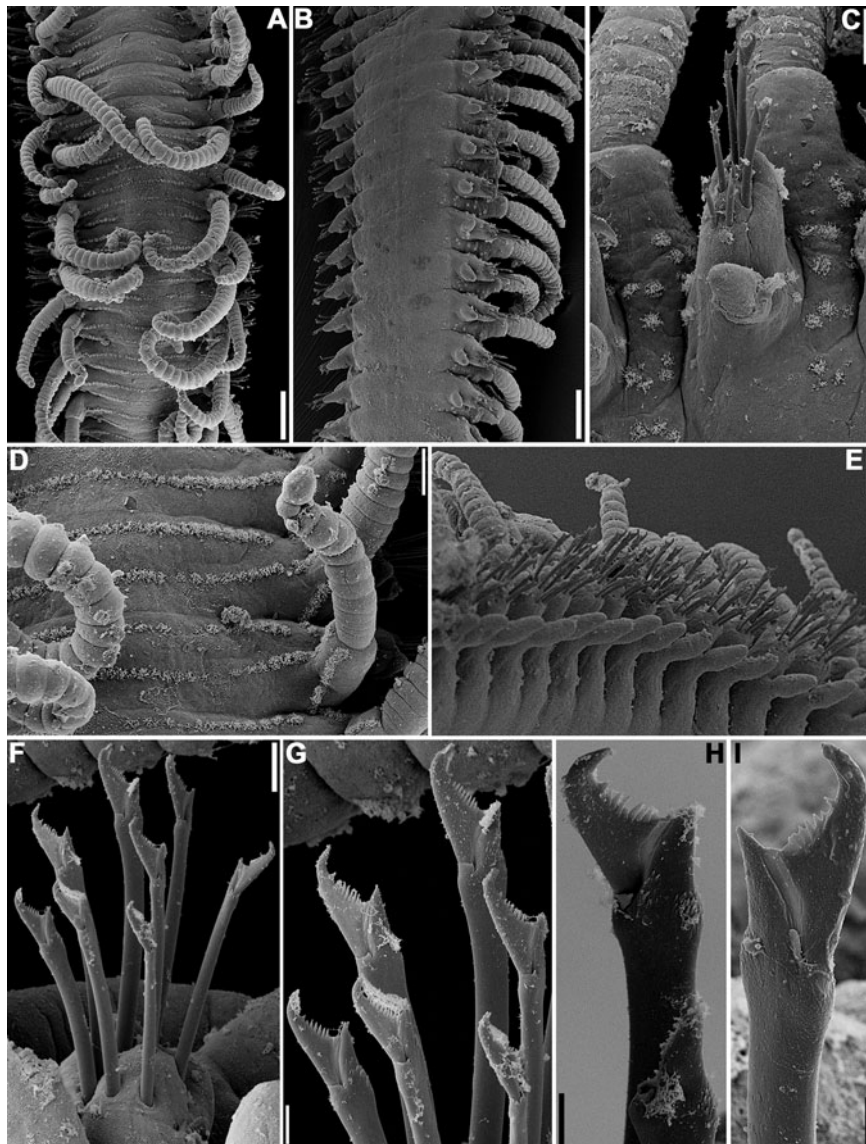


Fig. 5. *Trypanosyllis aurantiacus* sp. nov. (A–G) specimen 2; (H, I) specimen 1. (A) Midbody segments, dorsal view; (B) midbody segments, ventral view; (C) midbody parapodium, ventral view; (D) ciliation on midbody segments, dorsal view; (E) midbody parapodia, lateral view; (F) falcigers, anterior parapodium; (G) detail, same parapodium; (H) falciger, midbody parapodium; (I) falciger, posterior parapodium. Scale bars: A, B, 200 μm ; C, 50 μm ; D, 60 μm ; E, 90 μm ; F, 20 μm ; G, 9 μm ; H, I, 6 μm .

yellow to orange, sometimes with two transverse dark red bars per segment, quickly fading after preservation; antennae, peristomial cirri, dorsal cirri throughout and anal cirri dark red, due to inclusions arranged as one pair per article, darker on longer cirri from midbody (Figures 2A & 3A, B, G). Prostomium small, dorsally bilobed, with two pairs of eyes in trapezoidal arrangement, quickly fading after preservation, especially in slide mounted specimens; palps shorter than prostomium, kidney-shaped; lateral antennae with ~14 articles, originating frontally, at anterior border of prostomium, central antenna longer, with 12–19 articles, originating dorsally on prostomium, close to anterior border (Figure 4A–C, F & G; Table 2); nuchal organs as one posterior row of cilia around each prostomial lobe (Figure 4A,B). Peristomium dorsally reduced; dorsal pair of peristomial cirri with 17–24 articles, ventral pair with 7–15 articles (Figures 3A, B & 4A, C, F, G; Table 2). In atokous forms, body ventrally smooth, except on

parapodial lobes, which have one row of cilia arranged in irregularly distributed bunches (Figures 4F,G & 5B,C,E), with two transverse ciliated bands per segment dorsally, one near anterior border of segment, other at midlength (Figures 4A,B & 5A,D); cirrophores with an additional row of cilia posteriorly (Figure 5D). Dorsal cirri throughout long, distally pointed, with conspicuous cirrophores, those on segment 1 longer than following cirri, with 17–27 articles; until beginning of proventricule, dorsal cirri, with ~20 articles; from proventricular level, dorsal cirri alternating long and short, long cirri with 13–17 articles, short cirri with 7–11 articles (Figures 2A; 3A, B, G, 4A, C, G & 5A–E; Table 2). Ventral cirri short, digitiform, slightly exceeding parapodial lobes (Figures 4C,D,F,G & 5B,C,E). Anterior parapodia with 3–8 compound chaetae each, 3–6 chaetae per parapodium at midbody, 1–5 chaetae per parapodium on posterior chaetigers (Table 2). Compound chaetae as bidentate to sub-bidentate falcigers, shafts of unequal

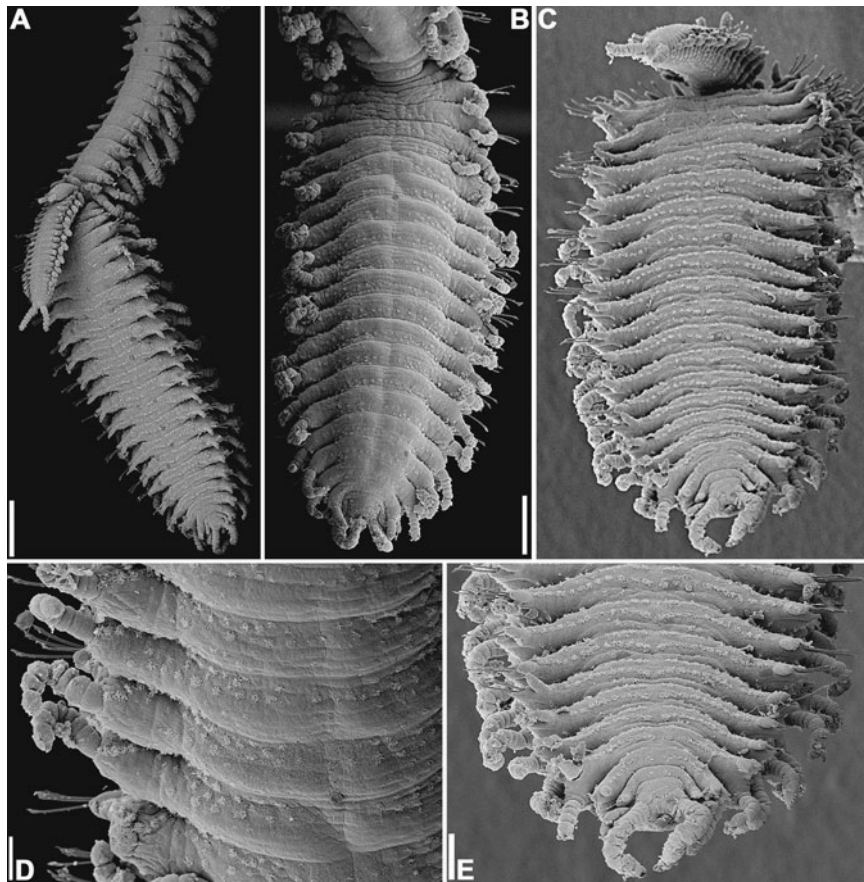


Fig. 6. *Trypanosyllis aurantiacus* sp. nov. (specimen 2). (A) posterior end, lateral view—three epitokous specimens budding from atokous specimen; (B) larger epitokous specimen, dorsal view; (C) same epitokous specimen, ventral view; (D) same epitokous specimen, detail, dorsal view; (E) same epitokous specimen, posterior end, ventral view. Scale bars: A, 300 μm ; B,C, 200 μm ; D, 60 μm ; E, 40 μm .

lengths and thicknesses, with few subdistal spines, blades with sub-distal tooth resembling an enlarged spine, with short spines on cutting edge; blades slightly diminishing in length towards posterior end, measuring $\sim 30\text{--}16\ \mu\text{m}$ on anterior chaetigers, $\sim 30\text{--}15\ \mu\text{m}$ on midbody parapodia, $\sim 20\text{--}10\ \mu\text{m}$ on posterior chaetigers (Figures 2B–D, 3D, E, H, I & 5F–I; Table 2); nearly on all chaetigers, falcigers in formation present inside parapodial lobes, not protruding yet (Figure 3D,G). Dorsal simple chaetae absent in all specimens examined; ventral simple chaetae present in some specimens including the holotype, chaetae sigmoid, slightly thinner than shafts of falcigers, sub-bidentate, sub-distal tooth resembling an enlarged spine (Figures 2E & 3I; Table 2). Anterior body with up to 3 aciculae per parapodium, midbody parapodia with 2 aciculae each; aciculae thick, distally sharp, tips protruding from parapodial lobes, one of them slightly curved distally; posterior parapodia with single acicula, with same morphology as on anterior and midbody chaetigers (Figures 2F–H & 3F–H). Several specimens with up to 8 achaetous segments in the posterior end, followed by large unsegmented zone with chaetigers in formation (Figures 2I & 3C). Body terminating by one pair of anal cirri, with ~ 14 articles (Figures 2I & 3C; Table 2). Pharynx extending for 9–13 chaetigers, with 10 rounded papillae at anterior end and trepan with 10 small, triangular teeth, central tooth absent (Figure 4D,E); proventricles through 7–8 chaetigers, with ~ 28 rows of muscle cells (Figures 2A & 3A; Table 2).

BIOLOGY

Six of the specimens examined were budding *Tetraglene* stolons from the posterior part of the body. Atokous forms budding up to 9 epitokous simultaneously were observed. Epitokous forms conspicuously ciliated, with one irregular row of cilia dorsally, arranged in circular bunches (Figure 6B,D), two continuous rows of cilia ventrally, one of which near anterior border of segment, the other at midlength (Figure 6A,C&E). Epitokous forms with 1–3 falcigers per parapodium, notopodial capillary chaetae absent in all specimens examined.

REMARKS

This species is particularly tricky because several of its characters fade very quickly after preservation, making it difficult to identify from preserved specimens. Not only body pigmentation, except for dorsal cirri, disappears in preserved material, but also the eyes fade and disappear in a matter of days in slide mounted specimens, the same happening with proventricular rows muscle cells (Figure 3A,B). Therefore, the colour of the specimens is useful for the identification of this species, but only on live or freshly collected material; on the other hand, the absence of pigmentation on preserved material, especially on slide mounted specimens, is also characteristic, as the

Table 2. Variation among the slide mounted specimens of the type-series of *Trypanosyllis aurantiacus* sp. nov. ('?' was attributed when the condition of the specimen did not allow to see that character; '-' was attributed when that particular structure was absent in that specimen).

	Holotype MZUSP 589	Paratype 1 MZUSP 590	Paratype 2 MZUSP 591	Paratype 3 MZUSP 592
Total length × width at proventricle (mm); number of chaetigers	10.06 × 0.6; 113	9.48 × 0.65; 119	5.17 × 0.45; 66	7.25 × 0.57; 85
Length of pharynx (number of chaetigers)	10.5	12	9	11
Length of proventricle (chaetigers); number of rows muscle cells	7; 28	9; 28–29	6; 29	6; ?
Ventral simple chaeta beginning from (chaetiger)	94	94	48	56
Number of articles of central × lateral antennae	12 × 13–14	16 × 15	14 × 10	19 × 13
Number of articles of dorsal × ventral peristomial cirri	24 × 11	22 × 9	17–19 × 7	22 × 9
Number of articles of dorsal cirri on chaetiger 1, long dorsal cirri throughout, short dorsal cirri throughout, and anal cirri	27, 13–15, 8–11, 15	21, 14–17, 7–9, 14	17, 13–15, 7–9, 12	26, 15–17, 7–9, –
Number of falcigers per parapodium on anterior, midbody, and posterior chaetigers	4–6, 4, 1–3	6–8, 5–6, 2–5	3–5, 3–4, 1–3	5–7, 5–6, 1–3
Length of blades of falcigers on anterior, midbody, and posterior chaetigers (µm)	26–19, 30–23, 20–18	30–22, 28–17, 20–18	23–16, 20–15, 15–10	25–16, 25–15, 20–12
Number of posterior chaetous segments	8	6	7	5

species of *Trypanosyllis* usually have conspicuous dorsal pigmentation.

Trypanosyllis aurantiacus sp. nov., is part of a small group of species of *Trypanosyllis* with falcigers with bidentate blades, with subdistal tooth distinctly shorter than distal one, condition sometimes referred to as 'sub-bidentate'. To this group also belong *T. aeolis* Langerhans, 1879, *T. parazebra* Hartmann-Schröder, 1965, *T. savagei* Perkins, 1980, *Trypanosyllis* sp. B *sensu* Uebelacker, 1984, *Trypanosyllis* (*Trypanosyllis*) sp. B *sensu* Kudenov & Harris, 1995, and *T. sanmartini* Çinar, 2007.

Trypanosyllis aurantiacus sp. nov., differs from *T. aeolis* by having smaller body, by the absence of rounded papillae forming two transverse lines on the dorsum of each segment, by the presence of ventral simple chaetae, by the absence of a thinner acicula on parapodial lobes and by having a longer pharynx, extending through 9–12 segments, instead of only through 4 segments as in *T. aeolis* (San Martín, 2003).

Trypanosyllis parazebra possesses pigmentation as a single transverse brown bar per segment dorsally, antennae and cirri throughout with fewer articles (central antenna: 10 articles; lateral antennae: 8–9 articles; peristomial dorsal cirri: 9–11 articles; peristomial ventral cirri: 7 articles; dorsal cirri of anterior parapodia: 9–11 articles; dorsal cirri of posterior parapodia: 6–7 articles), peristomium not reduced dorsally as in *T. aurantiacus* sp. nov., just slightly shorter than following chaetigers, aciculae straight, needle-like, and anterior parapodia with 2 aciculae each at most. Finally, *T. parazebra* has a large central tooth in the pharynx and smaller proventricle, extending through ~4 segments, with 17 rows of muscle cells (Hartmann-Schröder, 1965).

Trypanosyllis savagei is a smaller species, less than 5 mm long and with 80 chaetigers at most. It also differs from our new species by possessing antennae, tentacular cirri and dorsal cirri throughout with 4–8 articles only, blades of falcigers ~12 µm long throughout, with smooth shafts, shorter anal cirri, with 3 articles each, and smaller proventricle, occupying 3–4 segments, with ~17 rows of muscle cells (Perkins, 1980).

Trypanosyllis sp. B *sensu* Uebelacker, 1984 also has antennae, tentacular cirri and dorsal cirri throughout shorter than *T. aurantiacus* sp. nov., with 8 articles at most. Furthermore, *Trypanosyllis* sp. B *sensu* Uebelacker differs from *T. aurantiacus* sp. nov., by having shorter proventricle, extending through 4–5 segments, with ~21 muscle cell rows, and shorter pharynx, extending for 3–4 segments (Uebelacker, 1984).

Trypanosyllis sp. B *sensu* Kudenov & Harris, 1995, is distinguished from *T. aurantiacus* sp. nov., by possessing a tuft of cilia on the last article of antennae, peristomial and dorsal cirri, at least on anteriormost chaetigers, according to the figure provided by Kudenov & Harris (1995: figure 1.30A). Furthermore, *Trypanosyllis* sp. B *sensu* Kudenov & Harris, 1995 has the superiormost falcigers with nearly smooth blades, becoming progressively more conspicuously spinulated inferiorly, blades with somewhat stronger subdistal tooth, according to the figures provided (Kudenov & Harris, 1995: figure 1.30F–H), and aciculae with hook-like subdistal collar (Kudenov & Harris 1995: figure 1.30J–K).

Finally, a recently described species from Turkey, eastern Mediterranean, is the most similar species to *T. aurantiacus* sp. nov. *Trypanosyllis sanmartini* presents pattern of

pigmentation, distribution of chaetae throughout, morphology of pharynx and proventricle, and stolonization very similar to *T. aurantiacus* sp. nov. However, it differs from *T. aurantiacus* sp. nov., in having each anterior segment with 2 rows of papillae on dorsum, more articles on antennae and cirri throughout (central antenna: 28 articles; lateral antennae: 20 articles; peristomial dorsal cirri: 30 articles; peristomial ventral cirri: 20 articles; anterior dorsal cirri: 18–38 articles; posterior dorsal cirri: 12–26 articles), cirrophores with papillae but without cilia, longer blades of falcigers, measuring ~40–27.5 µm on anterior body, ~42.5–30 µm on midbody, and ~40–25 µm on posterior chaetigers, and pharynx and proventricle densely pigmented (Çinar, 2007). As the Brazilian specimens studied for this paper were adults, many of them budding *Tetraglene* stolons, differences in size cannot be attributed to different ontogenetic stages. In addition to the geographical distribution, we consider those differences enough to describe *T. aurantiacus* sp. nov., as a new species.

ETYMOLOGY

The specific name *aurantiacus* is attributed to this species due to the colour of specimens in life (*aurantiacus* = Latin for ‘orange colour’).

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