

Six new species of *Hesionura* (Phyllodocidae, Annelida) and redescription of *H. laubieri* (Hartmann-Schröder, 1963) from southern and south-eastern Brazil

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Six new species of *Hesionura* are described from estuarine and continental shelf bottoms off southern and south-eastern Brazil. *Hesionura laubieri* (Hartmann-Schröder, 1963) is redescribed based on newly collected material. *Hesionura ceciliae* sp. nov. is diagnosed by conical ventral cirri on anterior and median segments, with tapered distal ends, and by four bidentate chaetae throughout the body, except in the last segments, which have an additional supracircular unidentate chaeta. The ventral cirri on median parapodia of *Hesionura biformata* sp. nov. are more than 1.5 times as long as the neuropodial lobes, abruptly tapering on posterior segments; posterior parapodia have one bidentate and two unidentate subacicular chaetae. *Hesionura variodontata* sp. nov. has conical tentacular ventral cirri, anterior and median parapodia with first dorsal chaeta tridentate and the other three bidentate, and posterior parapodia with four chaetae, the three most dorsal bidentate and the most ventral unidentate. The ventral tentacular cirri of *Hesionura carioca* sp. nov. are cylindrical and elongated, with tapered distal ends; dorsal cirri are oval, and posterior parapodia have one tridentate, three bidentate and one unidentate chaetae. Adults of *Hesionura longissima* sp. nov. reach up to 21 mm, a length not previously been reported for the otherwise meiofaunal genus *Hesionura*; their first supracircular chaeta is quadridentate and dorsal and ventral cirri are rounded in reproductive stages. *Hesionura lupina* sp. nov. has cylindrical and elongated ventral tentacular cirri, with tapered distal ends, oval dorsal cirri, cylindrical ventral cirri, and posterior parapodia with five bidentate chaetae.

Keywords: Phyllodocidae, *Hesionura*, Brazil

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INTRODUCTION

Hartmann-Schröder (1958) proposed *Hesionura* for *Hesionura fragilis* Hartmann-Schröder, 1958. It was originally diagnosed by a rectangular, longer than wide, prostomium. Hartmann-Schröder (1960) later proposed *Eteonides* also diagnosed by a longer than wide prostomium. These two genera are so similar that Hartmann-Schröder herself (1963) regarded them as synonyms, but quite surprisingly, she preferred to use *Eteonides* over *Hesionura*. It was Hartman (1965) who corrected the priority, since *Hesionura* is the senior synonym over *Eteonides*.

Hesionura, along with the genera *Pseudomystides*, *Pelagobia*, *Eteone*, *Mysta* and *Hypereteone*, belongs to the subfamily Eteoninae, a group defined by lacking a dorsal cirri on the second (*Eteone*, *Mysta* and *Hypereteone*) or third segment, and two or three pairs of tentacular cirri (Bergström, 1914;

Hartmann-Schröder, 1971). More recently, Pleijel (1991) included a series of other genera in Eteoninae: *Pirakia*, *Pterocirrus*, *Eumida*, *Sige*, *Eulalia*, *Protomystides*, *Mystides*, *Galapagomystides*, along with *Pseudomystides*, *Hesionura* and *Eteone* (with *Mysta* and *Hypereteone* synonymized with *Eteone*). This clade is supported by the presence of nuchal organs, with a latero-posterior protrusion in the prostomium, and the presence of dorsal cirri on the third segment.

Hesionura is currently characterized by well-developed segments all along the body, an elongated prostomium, usually much longer than wide, paired frontal antennae and palps, no median antenna, small eyes in the posterior-dorsal part of the prostomium and nuchal organs in a groove between the prostomium and the first segment. The proboscis has diffusely distributed, rounded or conical papillae. Three pairs of tentacular cirri are present on the first two segments. The tentacular cirri are cylindrical and have short cirrophores and long cirrostyles, except for the ventral pair, which is somewhat flattened. Dorsal cirri are absent on the third segment. Dorsal and ventral cirri are long, cylindrical or rounded. The parapodia are uniramous. The pre-chaetal lobes are symmetrical and bilobate. Chaetae are present from the third

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segment. The rostrum of the shaft may be unidentate, bidentate, tridentate, or quadridentate, whereas articles are short, strongly serrulated and present in various forms. The pygidium has one pair of long, cylindrical cirri (Pleijel, 1991, 1993a, b; Viéitez *et al.*, 2004).

We observed one small tooth on the medial surface of each large tooth on the chaetal rostrum of all the new species (Figures 9C, 19A, 26C), a character previously unreported for the genus (note: these small teeth are not included when characterizing a chaeta as bidentate, tridentate or quadridentate). A median pygidial papilla had not been observed by Pleijel (1993a) or Viéitez *et al.* (2004), although it was reported by Hartmann-Schröder (1960) for *Eteonides* and subsequently in *Hesionura shandongensis* Zhao & Wu, 1991. In our study, a pygidial papilla was observed in *Hesionura biformata* sp. nov., *H. variodentata* sp. nov., *H. carioca* sp. nov. and *H. lupina* sp. nov. It is likely that pygidial papillae have passed unnoticed by other taxonomists because of their small size.

There are currently 13 described species in the genus, of which only *Hesionura laubieri* (Hartmann-Schröder, 1963) was already known from Brazil (Amaral *et al.*, 2012). Besides redescribing *H. laubieri* based on newly collected material, we describe herein six new species, bringing the total in the genus to 19. This study is part of an ongoing extensive survey of the Phyllococidae from southern and south-eastern Brazil.

MATERIALS AND METHODS

Collection of biological material

Altogether 251 individuals were examined, mostly from collections of living material made by the first author in 2009, 2010 and 2011 in the States of Rio de Janeiro, Paraná and Santa Catarina, in south-eastern and southern Brazil

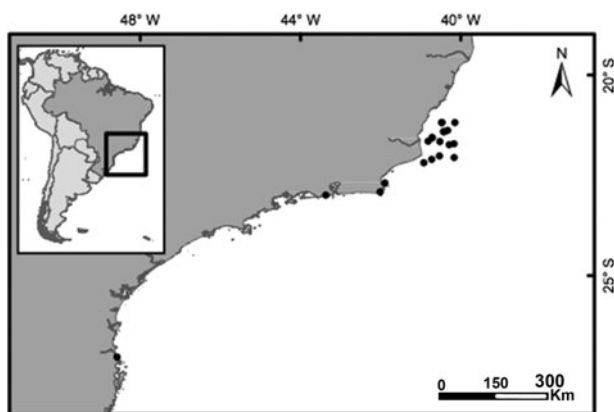


Fig. 1. Collection sites in southern and south-eastern Brazil, off the States of Santa Catarina, São Paulo, Rio de Janeiro and Espírito Santo.

(Figure 1). Other examined specimens had previously been collected during the Habitats/Petrobrás and Revizee Score Sul projects. Additional material, used for comparisons, was examined at the Zoological Museum, Natural History Museum of Denmark (ZMUC) and at the Zoologische Museum of Hamburg. Holotypes are deposited at the Zoology Museum from Universidade Estadual de Campinas (ZUEC); paratypes are deposited at ZUEC and ZMUC.

Animals were collected from sub-littoral estuarine soft bottoms to exposed oceanic beaches, and from shallow platform depths down to 98 m. Sediment samples were taken with a Petit Ponar grab and corers. Samples were sieved through 260 μm meshes to remove fine sediments. Live specimens from shallow sites were placed in plastic containers with seawater and transported to the lab in coolers with ice. Animals were kept in aquaria under room temperature, anaesthetized with menthol in seawater for more detailed morphological analyses and subsequently fixed in 4% formalin and preserved in 70% ethanol.

Identification routines

Semi-permanent slides were mounted with gel and glycerin (Amaral & Nonato, 1987), for more detailed observations of the morphology of papillae, parapodia and chaetae. The same technique was used for whole organisms, in the case of smaller animals, which improved the visualization of the degree of fusion of the anterior segments and the distribution of tentacular cirri. The specimens were identified using stereoscopic and optical microscopes and, in some cases, scanning electron microscopy. Descriptions were prepared following the terminology adopted by Pleijel (1993a) for the family and are presented in the sequential order illustrated in Figures 2–5 and Table 1. Measures of median width included only parapodia, without considering the chaetae. For improved contrast in checking for papillae, Shirlastain A dye was used on some specimens.

Photographs were taken with a Canon PowerShot S45 digital camera with 4.0 MP resolution coupled to the stereoscopic and optical microscopes. Scanning electron microscope photographs were taken from fixed specimens previously transferred to 1% osmium in distilled water for 1 h. The specimens were dehydrated in an alcohol series of 50%, 60% and 70% for 5 min each, followed by 90% and 95% for 15 min each, kept in 100% alcohol and then transferred to a MEV BAL-TEC CPD030 (SEM) for critical point drying. The specimens were sputter coated with gold at a thickness of 102 Å in a SCD-030-Balzers FL9496 sputter coater and subsequently examined in a JSM6360LZ GOAL at the Electron Microscopy Center at the Federal University of Paraná. The scanning photographs taken at the Zoological Museum of the University of Copenhagen followed the same methodology, with the exception of the replacement of osmium by acetone and use of an alcohol series of 90%, 99% alcohol; 2:1.

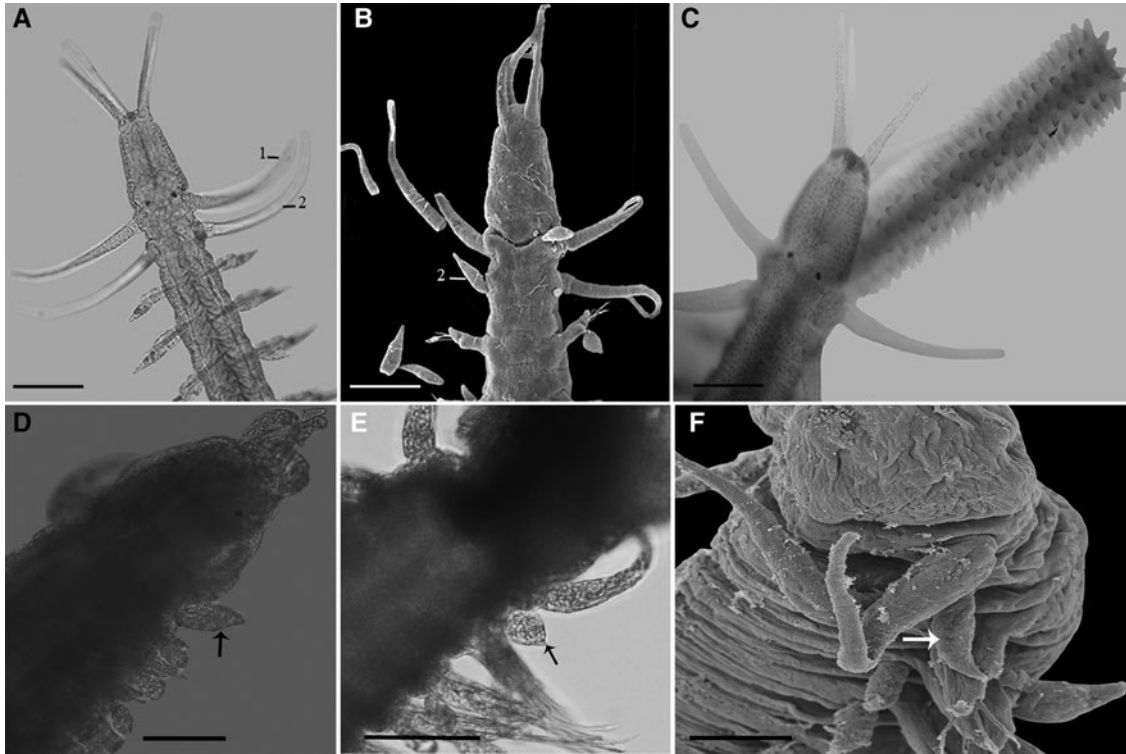


Fig. 2. Terminology used for the descriptions of *Hesionura*: (A, C) Dorsal view of *H. laubieri*; (B) Ventral view of *H. laubieri*; (A, B) Morphology of the prostomium and anterior segments of *H. laubieri*; (A) Prostomium elongated with frontal protuberance, where antennae and palps are located; (C) Undivided proboscis of *H. laubieri* (i.e. the anterior and posterior portions do not differ from one another). Formula for the tentacular cirri: (A, B) $1 + 2 + 0$ = First dorsal tentacular cirri, second segment with dorsal and ventral tentacular cirri; 0 = Loss of dorsal cirri. Tentacular cirri morphology: (A–C) First and second pairs of dorsal tentacular cirri cylindrical; (B) Cylindrical ventral tentacular cirrus with inflated base and tapering distal end; (D) Ventral tentacular cirrus oval to elongated of *H. longissima* sp. nov. (arrow); (E) Rounded ventral tentacular cirrus of mature *H. longissima* sp. nov. (arrow); (F) Ventral tentacular cirrus with inflated base and tapering distal end of *H. carioca* sp. nov. (arrow). Scale bars: A–B, 0.05 mm; C, 0.06 mm; D–F, 0.05 mm.

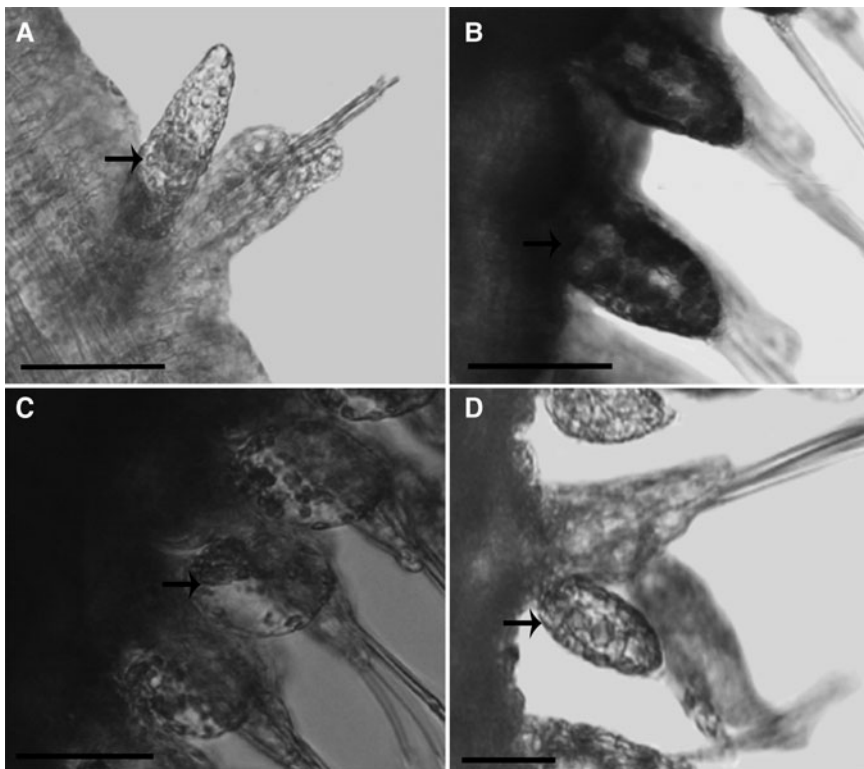


Fig. 3. Terminology used for the descriptions of *H. laubieri*, *H. ceciliae* sp. nov., *H. biformata* sp. nov., *H. variodentata* sp. nov., *H. carioca* sp. nov., *H. longissima* sp. nov. and *H. lupina* sp. nov.; morphology of the parapodial dorsal cirri, in anterior view (arrow): (A) Dorsal cirrus cylindrical of *H. laubieri* (arrow); (B) Dorsal cirrus oval to elongated (arrow); (C) Dorsal cirrus cylindrical to rounded of *H. longissima* sp. nov. (arrow); (D) Dorsal cirrus cylindrical with rounded distal end of *H. variodentata* sp. nov. (arrow). Scale bars: A–D, 0.05 mm.

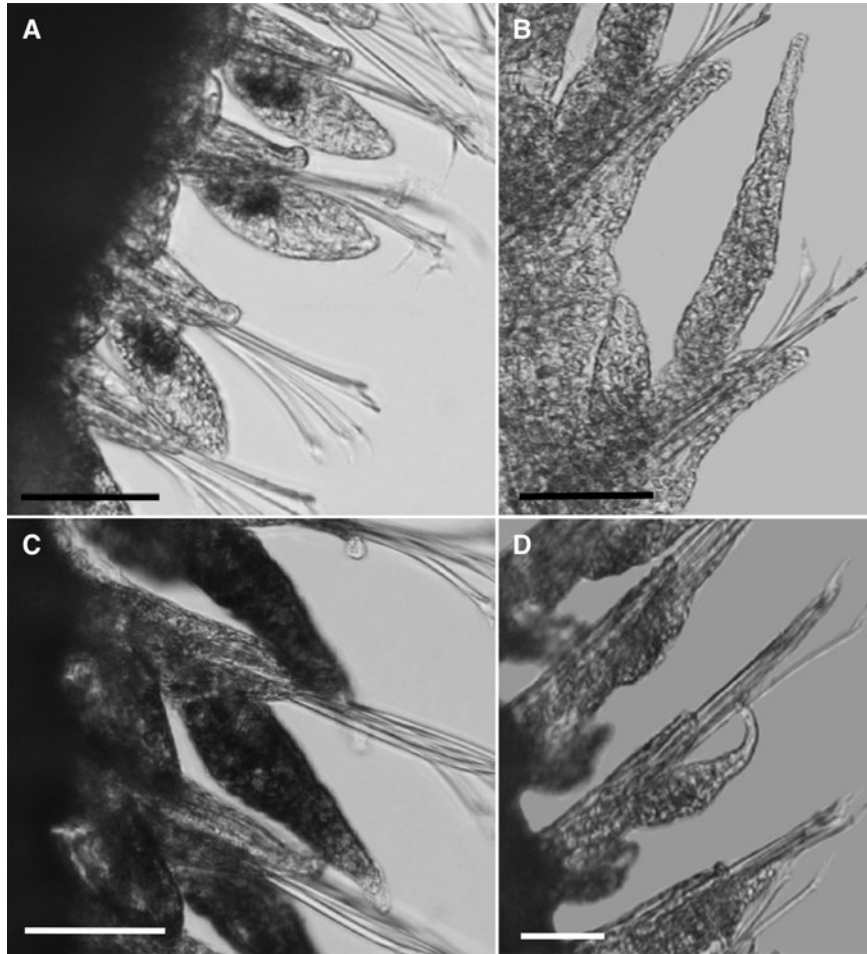


Fig. 4. Terminology used for the descriptions of *H. laubieri*, *H. ceciliae* sp. nov., *H. biformata* sp. nov., *H. variodentata* sp. nov., *H. carioca* sp. nov., *H. longissima* sp. nov. and *H. lupina* sp. nov.; morphology of the ventral cirri, in ventral view: (A) Oval ventral cirrus oval of *H. longissima* sp. nov.; (B) Long and slender ventral cirrus of *H. laubieri*; (C) Conical ventral cirrus of median segments of *H. ceciliae* sp. nov.; (D) Dorsal cirrus cylindrical and abruptly tapered at the distal end of *H. biformata* sp. nov. Scale bars: A, 0.01 mm; B, 0.05 mm; C, 0.01 mm; D, 0.05 mm.

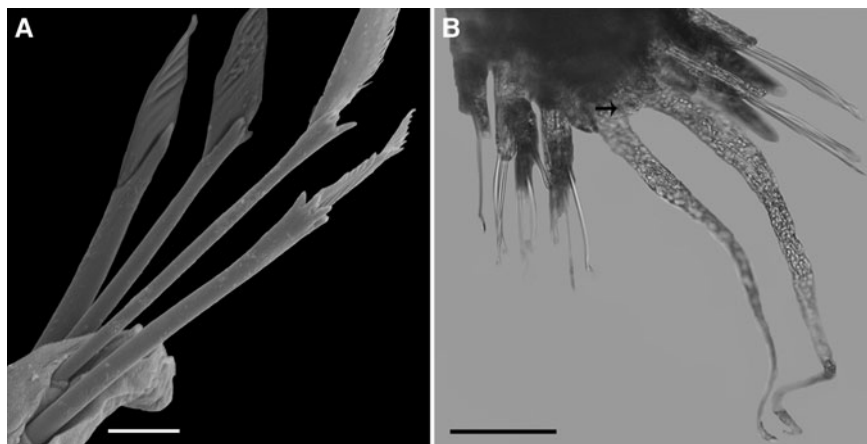


Fig. 5. Terminology used for the descriptions of *H. laubieri*, *H. ceciliae* sp. nov., *H. biformata* sp. nov., *H. variodentata* sp. nov., *H. carioca* sp. nov., *H. longissima* sp. nov. and *H. lupina* sp. nov.; chaetae and anal cirri: (A) Compound spinigerous chaetae of *H. longissima* sp. nov.; (B) Cirriform anal cirri; arrow indicates pygidial papilla of *H. biformata* sp. nov. (arrow). Scale bars: A, 0.05 mm; B, 0.01 mm.

Table 1. Diagnostic characters from *H. laubieri* and from the new species of *Hesionura* from southern and south-eastern Brazil.

Species	<i>H. laubieri</i>	<i>H. ceciliae</i> sp. nov.	<i>H. biformata</i> sp. nov.	<i>H. variodentata</i> sp. nov.	<i>H. carioca</i> sp. nov.	<i>H. longissima</i> sp. nov.	<i>H. lupina</i> sp. nov.
Anterior parapodia							
Uppermost chaeta	Bidentate	Bidentate	Tridentate	Tridentate	Tridentate	Quadridentate	Tridentate
Lowermost supraacicular chaeta	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate	Tridentate	Bidentate
1–2 uppermost subacicular chaetae	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate
Lowermost chaeta	Unidentate	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate
Median parapodia							
Uppermost chaeta	Bidentate	Bidentate	Tridentate	Tridentate	Tridentate	Quadridentate	Tridentate
Lowermost supraacicular chaeta	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate	Tridentate	Bidentate
1–2 uppermost subacicular chaetae	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate
Lowermost chaeta	Unidentate	Bidentate	Unidentate	Bidentate	Bidentate	Bidentate	Bidentate
Posterior parapodia							
Uppermost chaeta	Bidentate	Bidentate	Bidentate	Bidentate	Tridentate	Bidentate	Tridentate
Lowermost supraacicular chaeta	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate
Uppermost subacicular chaetae	Unidentate	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate	Bidentate
Second uppermost subacicular chaetae	–	Bidentate	Unidentate	–	Bidentate	–	Bidentate
Lowermost chaeta	Unidentate	Unidentate	Unidentate	Unidentate	Unidentate	Unidentate	Bidentate

SYSTEMATICS

Family Phyllodocidae Ørsted, 1843

Genus *Hesionura* Hartmann-Schröder, 1958
(= *Eteonides* Hartmann-Schröder, 1960)

Hesionura laubieri (Hartmann-Schröder, 1963)
(Figures 2A–C & 6–9)

Eteonides laubieri Hartmann-Schröder, 1963, 228; Laubier, 1967, 93.

Hesionura laubieri. Westheide, 1974, 4–6. pl. 1; Amaral *et al.*, 2010, 63; 2012, 74.

TYPE MATERIAL

Paratypes. 8 specimens. ZMH–14150. Zapallar, Valparaiso, Chile.

MATERIAL EXAMINED

27 individuals, length from 0.5 to 4.0 mm and number of segments from 27 to 88. Rio de Janeiro: Barra da Tijuca Beach, 23°00'51"S 43°22'23"W, 10 June 2010 (11 specimens, ZUEC–POL–14335); Barra da Tijuca Beach, 23°00'51"S 43°22'23"W, 10 June 2010 (5 specimens, ZMUC–POL–2421); Cabo Frio, 10 Feb 2011 (5 specimens, ZUEC–POL–16848). Santa Catarina: Estaleiro Beach, 27°01'49"S 48°34'48"W, 20 April 2009 (4 specimens, ZUEC–POL–16670). Estaleiro Beach, 27°01'49"S 48°34'48"W, 20 April 2009 (4 specimens, ZUEC–POL–16857); collected in coarse sand beaches. Continental shelf in the Campos Basin: Hab17 Foz30 R3, 21°34'12.552"S 40°25'32.724"W, 28 m, 23 July 2009 (1 specimen, ZUEC–POL–16838).

DIAGNOSIS

Four chaetae per parapodium throughout the body, two bidentate supracular and two subacicular chaetae, one of them bidentate.

DESCRIPTION

Largest examined specimen incomplete, with 15 segments, 1.0 mm in length, 0.02 mm wide at median part of body, including parapodia and excluding chaetae. Body long, very slender and tapered at posterior end. Prostomium elongated and clearly longer than broad, antennae and palps inserted on a well-developed anterior protuberance (Figure 2A–C). Antennae and palps of similar size, conical and slender. Antennae and palps as long as prostomium. One pair of eyes at posterior margin of prostomium (Figure 2A). Undivided proboscis, diffusely covered with conical papillae (Figure 2C). Terminal ring of proboscis with larger, conical papillae (Figure 2C). First segment visible dorsally. Tentacular cirri of segment 1 and dorsal tentacular cirri of segment 2 cylindrical, with short cirrophores and long cirrostyles; ventral tentacular cirri of segment 2 cylindrical, with inflated base and tapered distal end. First pair of tentacular cirri reaching segment 4. Dorsal and ventral tentacular cirri of segment 2 reaching segments 5 and 2, respectively (Figure 2A–C). Neuropodia and ventral cirri from segment 3. Dorsal cirri absent on segment 3. Normal dorsal cirri with well-developed cirrophores without dorsal extensions, from segment 4, symmetrical and cylindrical, anterior ones more slender than other dorsal cirri and 1.5 times as long as lobes. Dorsal cirri of median segments robust and longer than dorsal cirri of posterior segments. Neuropodia symmetrical, clearly shorter than ventral cirri, with light-brown acicula. Prechaetal lobes bilobate, symmetrical and rounded. Postchaetal lobes rounded. Ventral cirri horizontally oriented in relation to lobes, with inflated bases and tapered distal ends on anterior parapodia; median ventral cirri longer and more slender; more robust and shorter on posterior segments (Figures 6A, B & 7A–C). A similar pattern of cirri development and arrangement was also observed in paratypes (Figure 8A, B). Two supracular and two subacicular

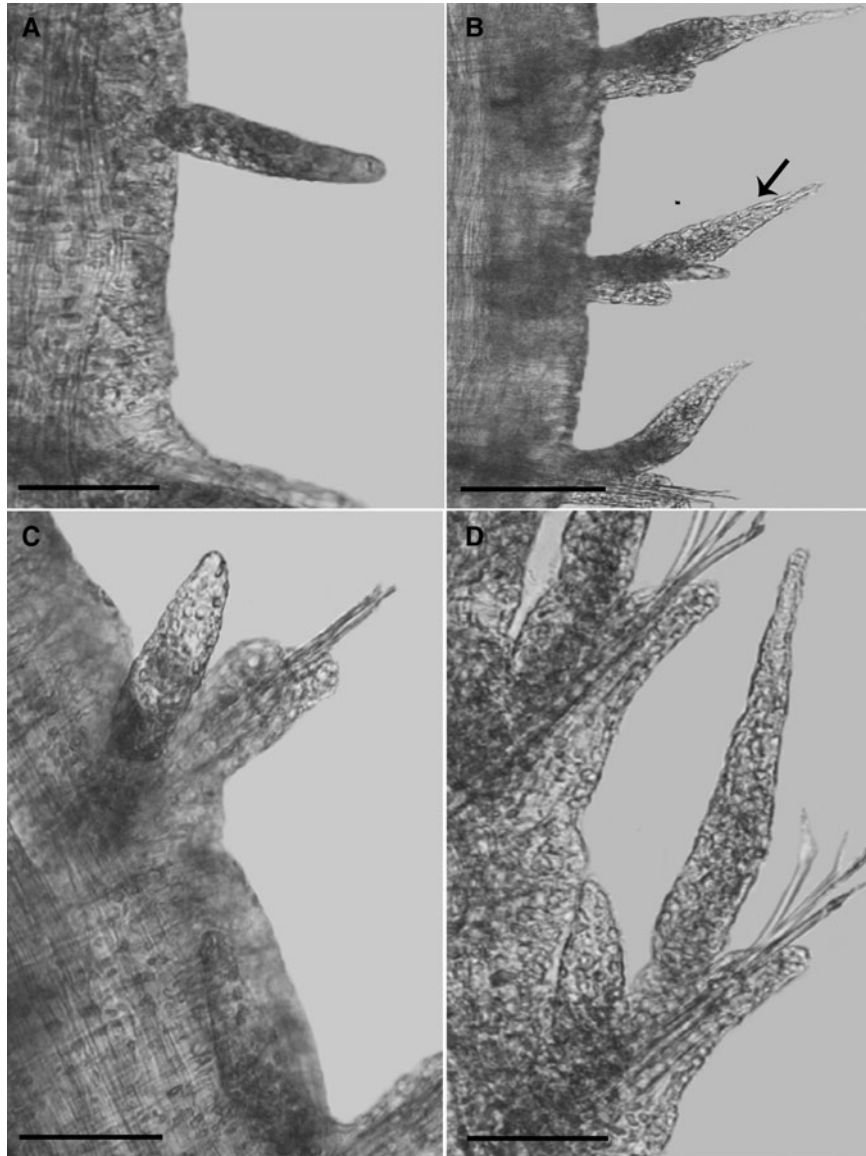


Fig. 6. *Hesionura laubieri*. Dorsal views of parapodia: (A) Parapodium 10, dorsal cirrus; (B) Parapodium 10, ventral cirrus (arrow); (C) Parapodium 43, ventral cirrus; (D) Parapodium 45 with dorsal (left) and ventral (right) cirri, dorso-ventral view. Scale bars: 0.05 mm.

spinigerous compound chaetae from segment 3. Rostrum of three uppermost chaetae bidentate and of lowermost one unidentate. Supracicular chaetae bidentate and subacicular chaetae unidentate in posterior parapodia, articles of varied shape and degrees of serration (Figure 9A–D). Pygidium with one pair of long, slender, cylindrical anal cirri; pygidial papilla not observed (Figure 7D).

COLOUR

Living specimens with bright green pigmentation. Mature animals show dark green pigmentation on the posterior segments (Figure 2C). When preserved, animals have an opaque pigmentation with brown parapodial cirri.

DISTRIBUTION

Atlantic Ocean, Brazil: Beaches in Santa Catarina, Rio de Janeiro and Bahia. Pacific Ocean: Valparaiso – Chile.

REMARKS

The morphological characteristics of the material from the Brazilian coast coincide well with the paratypes deposited in Valparaiso, Chile. However, the phylogenetic affinities between populations from the Atlantic and Pacific coasts of South America can only be confirmed through molecular analyses. *Hesionura laubieri* is the only species previously reported from Brazil (Westheide, 1974). Most of the regional reports probably refer to some of the other new species described herein. It differs from *Hesionura ceciliae* sp. nov. in having dorsal and ventral cirri longer than the parapodial lobes. The dorsal and ventral cirri of *H. ceciliae* sp. nov. are usually dark-brown, in contrast with those in *H. laubieri*, which are lighter in preserved animals. *Hesionura laubieri* differs from *H. biformata* sp. nov., as the ventral cirri in the latter are abruptly tapered in posterior parapodia. The dorsal and ventral cirri of *H. laubieri* are cylindrical and longer than the chaetae. They are cylindrical with

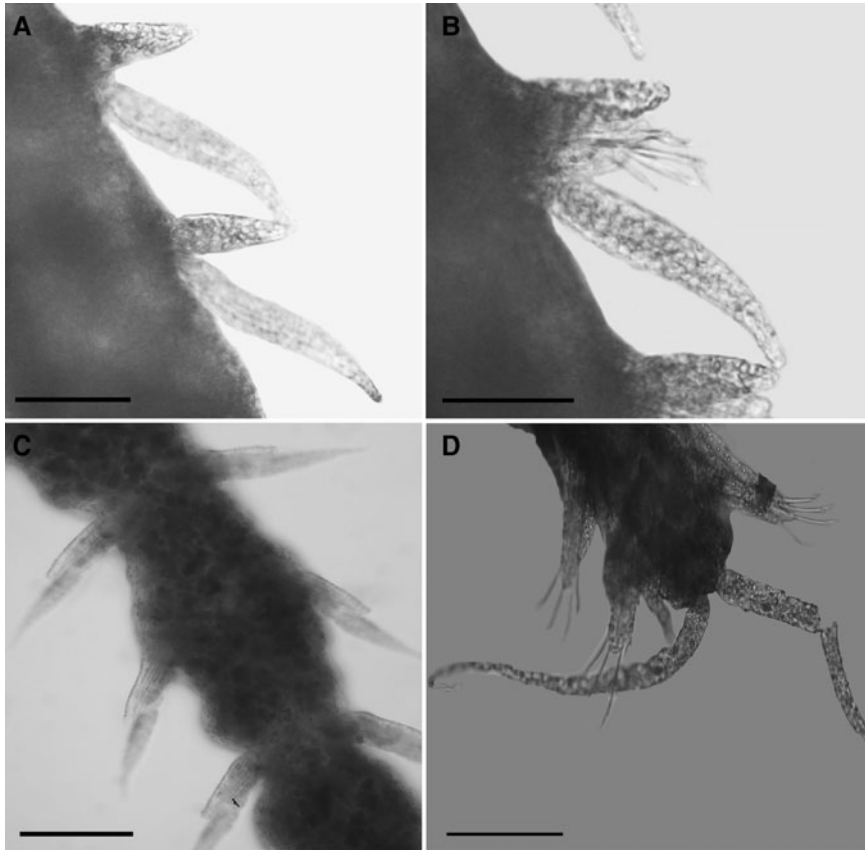


Fig. 7. *Hesionura laubieri*: (A–C) Dorsal views of parapodia; (A) Parapodium 90; (B) Parapodium 91; (C) Posterior segments of a specimen in reproductive stage; (D) Pygidium with anal cirri. Scale bars: A–C, 0.05 mm; D, 0.07 mm.

inflated bases in *Hesionura variodentata* sp. nov. and cylindrical with round distal ends in *H. carioca* sp. nov. *Hesionura laubieri* shares long and slender parapodial cirri with *H. augeneri* (Friedrich, 1937) and *H. australiensis* Hartmann-Schröder & Parker, 1990, but it differs from them by the number of teeth on the rostrum of chaetal shafts. It shares bidentate supracircular chaetae with *H. ceciliae* sp. nov. and *H. serrata* (Hartmann-Schröder, 1960), as well as four chaetae per parapodium with *H. australiensis*

and *H. variodentata* sp. nov. It differs from *Hesionura elongata* (Southern, 1914) by the absence of simple chaetae and the length of the parapodial cirri, which are half as long in *H. laubieri*. The absence of a pygidial papilla separates *Hesionura laubieri* from *H. biformata* sp. nov., *H. variodentata* sp. nov., *H. lupina* sp. nov. and *H. shandongensis* Zhao & Wu, 1991. All the species of *Hesionura* described herein share an elongated prostomium and long, cylindrical anal cirri.

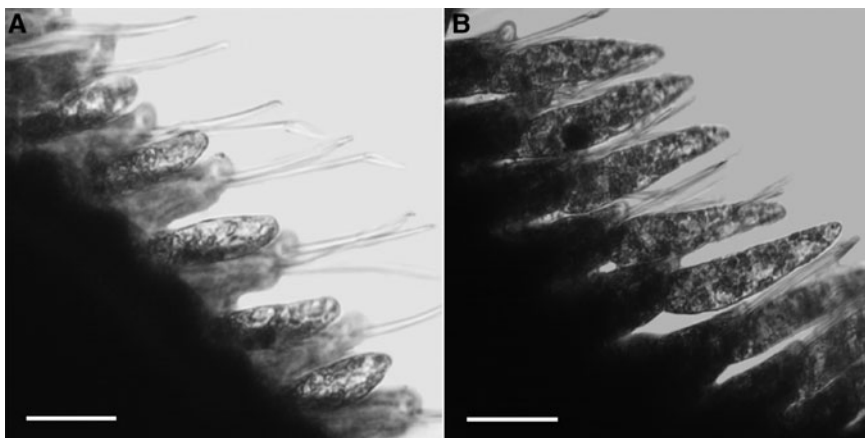


Fig. 8. *Hesionura laubieri*, paratypes: (A) Dorsal view of parapodia; (B) Ventral cirri from median segments, ventral view. Scale bars: 0.05 mm.

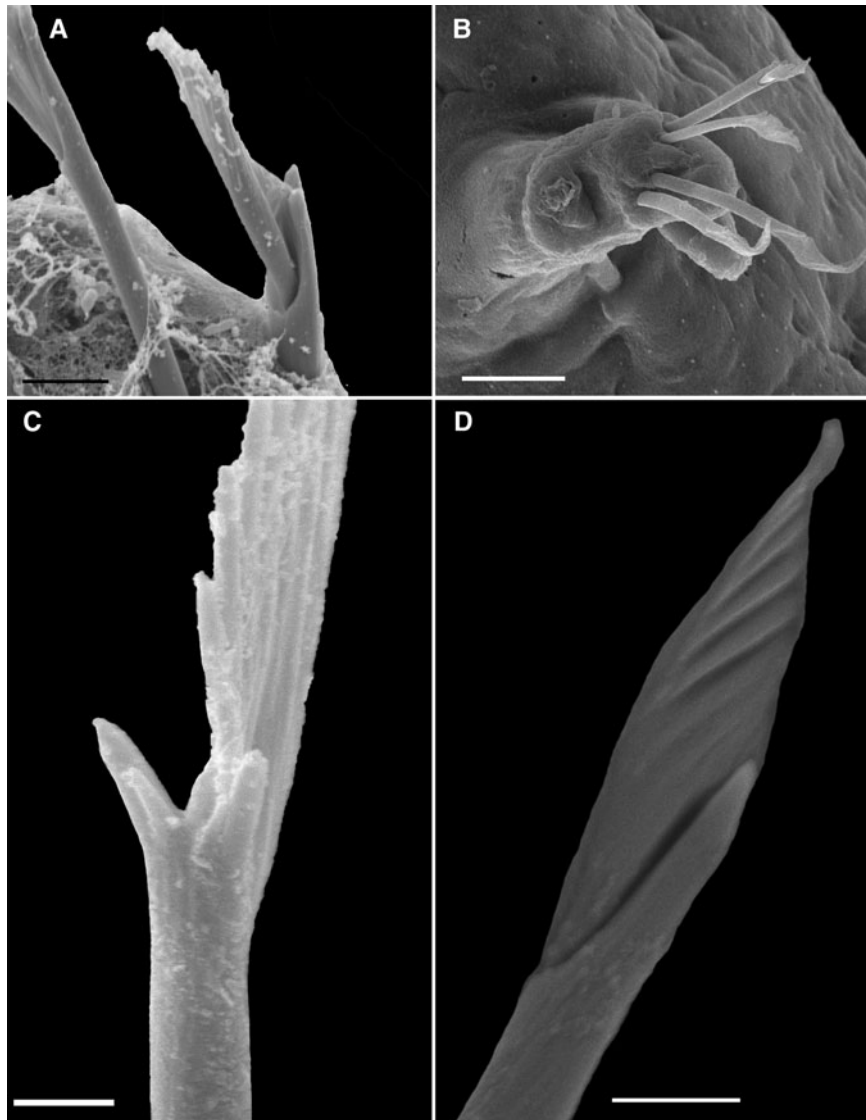


Fig. 9. *Hesionura laubieri*: (A) Supraacicular chaetae; (B) Posterior parapodium, antero-lateral view; (C) Bidentate chaeta; (D) Unidentate chaeta. Scale bars: A, 0.003 mm; B, 0.01 mm; C, D, 0.005 mm.

Hesionura ceciliae sp. nov.
(Figures 10–12)

TYPE MATERIAL

Holotype. Margin of continental shelf in Campos Basin, Brazil, Hab13 Ho4 R1, 21°42'53.723"S 40°10'15.249"W, 98 m; coarse sandy bottom, 9 March 2009 (ZUEC-POL-16876).

Paratypes. 40 paratypes, length from 1.0 to 4.0 mm and number of segments from 27 to 96. Continental shelf in Campos Basin, Brazil: Hab13 Io1 R2, 21°11'0.839"S 40°28'27.312"W, 26 m, 5 March 2009 (9 paratypes, ZUEC-POL-16883); Hab13 Foz16 R1, 21°12'14.127"S 40°42'26.060"W, 15 m, 7 March 2009 (3 paratypes, ZUEC-POL-17011); Hab13 Foz01 R2, 21°17'25.307"S 40°54'7.308"W, 15 m, 8 March 2009 (2 paratypes, ZUEC-POL-16898); Hab13 Ho2 R3, 21°44'18.9"S, 40°17'14.4"W, 49 m, 9 March 2009 (1 paratype, ZMUC-POL-2406); Hab13 Foz18 R2, 21°33'54.457"S 40°42'55.682"W, 22 m, 10 March 2009 (3 paratype, ZUEC-POL-17008); Hab13 Foz18 R3,

21°33'53.089"S 40°42'55.610"W, 21 m, 10 March 2009 (1 paratype, ZUEC-POL-17007); Hab13 Foz19 R1, 21°44'42.879"S, 40°43'9.193"W, 22 m, 11 March 2009 (1 paratype, ZMUC-POL-2407); Hab13 Foz30 R2, 21°34'12.572"S 40°25'32.411"W, 29 m, 13 March 2009 (1 paratype, ZUEC-POL-16875); Hab13 Foz43 R1, 22°12'18.796"S 40°14'39.451"W, 97 m, 15 March 2009 (2 paratypes, ZUEC-POL-16921); Hab16 Ho2 R2, 21°44'19.591"S 40°17'15.669"W, 50 m, 8 July 2009 (1 paratype, ZUEC-POL-17010); Hab16 Ho2 R3, 21°44'19.6"S 40°17'15.608"W, 49 m, 9 July 2009 (1 paratype, ZUEC-POL-16877); Hab17 Foz29 Ro1, 21°24'45.072"S 40°25'17.287"W, 32 m, 20 July 2009 (1 paratype, ZUEC-POL-16884); Hab17 Foz18 R3, 21°33'54.6"S, 40°2'53.9"W, 23 m, 20 July 2009 (3 paratypes, ZMUC-POL-2408); Hab17 Foz18 R2, 21°33'54.232"S, 40°42'55.434"W, 23 m, 20 July 2009 (1 paratype, ZMUC-POL-2409); Hab17 Io1 R2, 21°11'1.370"S 40°28'29.103"W, 26 m, 21 July 2009 (3 paratypes, ZUEC-POL-16957); Hab17 Io1 R3, 21°11'1.081"S 40°28'28.858"W, 26 m, 21 July 2009 (1 paratype, ZUEC-POL-16916); Hab17 Foz16 R1, 21°12'15.019"S 40°42'26.207"W, 16 m, 22 July 2009 (1

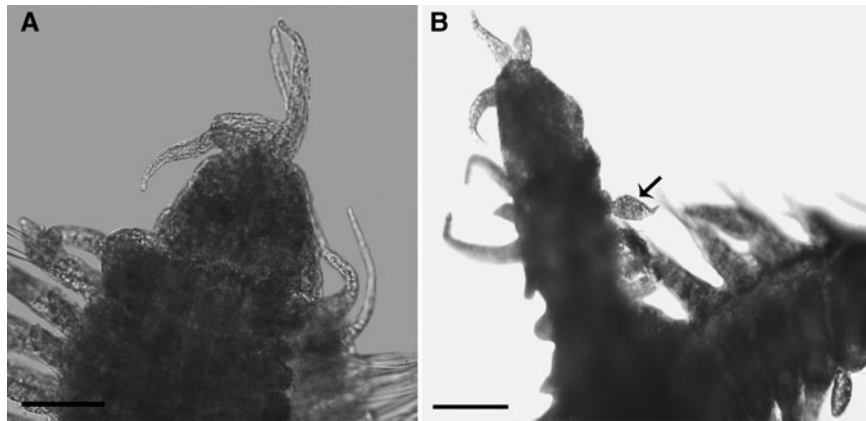


Fig. 10. *Hesionura ceciliae* sp. nov.: (A) Prostomium and anterior end of holotype, dorsal view; (B) Ventral tentacular cirrus of holotype (arrow). Scale bars: 0.05 mm.

paratype, ZUEC-POL-16903); Hab17 Foz24 R2, 21°50' 20.997"S 40°31'38.672"W, 28 m, 23 July 2009 (2 paratypes, ZUEC-POL-17006); Hab17 Foz30 R2, 21°34'13.655"S 40°25'31.571"W, 28 m, 23 July 2009 (1 paratype, ZUEC-POL-17009); Hab17 Foz23 R2, 21°01'9.4"S 40°31'55.3"W, 24 July 2009 (2 paratypes, ZMUC-POL-2410). Collected on substrates of coarse sand, between 22 and 98 m.

DIAGNOSIS

Ventral cirri on anterior and median segments conical, with tapered distal ends. Four bidentate chaetae throughout the body, except in the last segments, which have five chaetae of which the lowermost one is unidentate.

DESCRIPTION

Holotype a complete specimen with 57 segments, 3.0 mm in length, measuring 0.1 mm wide on median part of body including parapodia and excluding chaetae. Body long, very slender and tapered at posterior end. Prostomium elongated, much longer than wide, with antennae and palps inserted on a well-outlined anterior protuberance. Antennae and palps conical and slender, of similar size, longer than prostomium. One pair of eyes at posterior margin of prostomium (Figure 10A). Undivided proboscis, covered with diffusely distributed conical papillae. Terminal ring not observed. First segment visible dorsally. Tentacular cirri of segment 1 and dorsal tentacular cirri of segment 2 cylindrical, with short

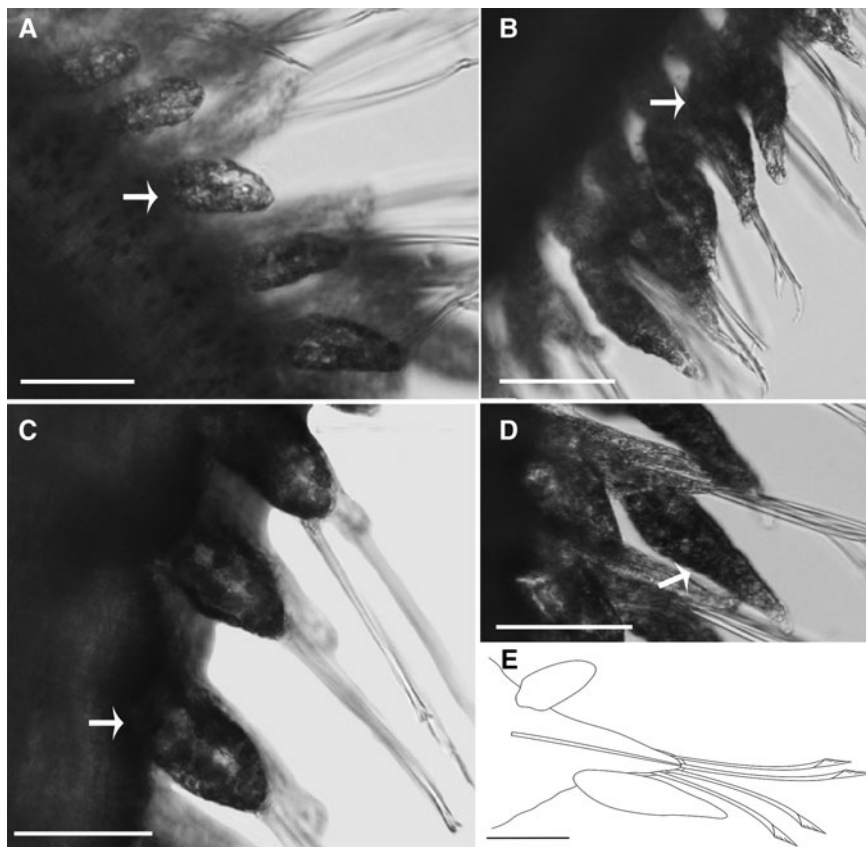


Fig. 11. *Hesionura ceciliae* sp. nov. Dorsal views of parapodia from the holotype: (A) Parapodium 6, with dorsal cirrus (arrow); (B) Parapodium 7, ventral cirri (arrow); (C) Parapodium 30, dorsal cirri (arrow); (D) Parapodium 30, ventral cirrus (arrow); (E) Posterior view of median parapodium. Scale bars: 0.05 mm.

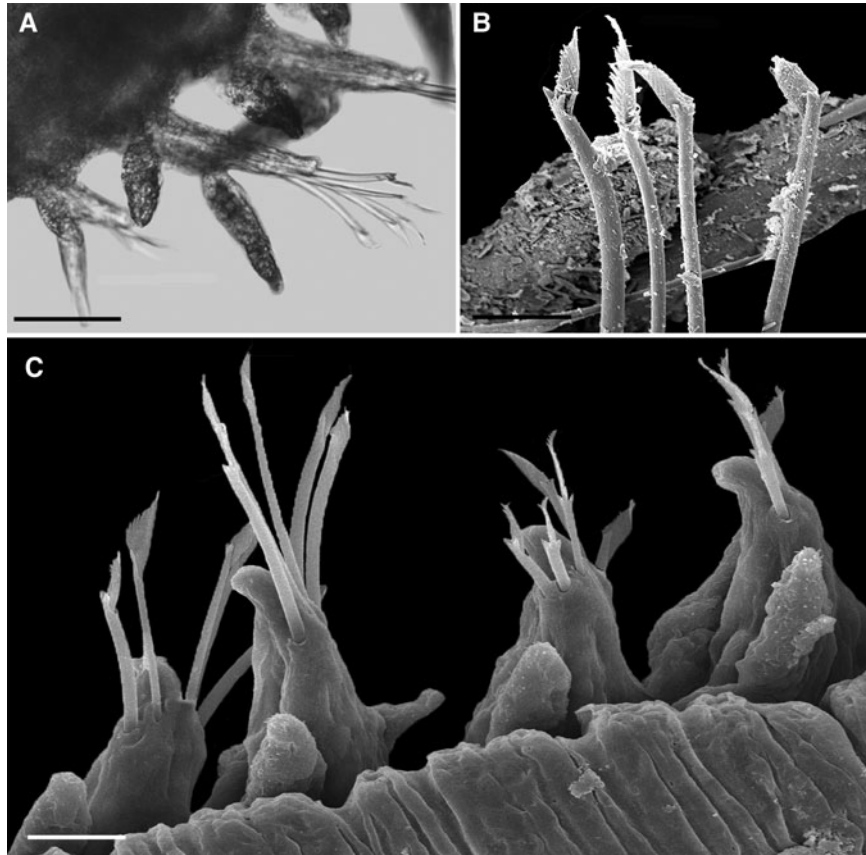


Fig. 12. *Hesionura ceciliae* sp. nov. Dorsal views: (A) Parapodium 59; (B) Bidentate chaetae from anterior parapodium; (C) Compound spinigerous chaetae in median parapodia. Scale bars: A, 0.05 mm; B, 0.006 mm; C, 0.01 mm.

cirrophores and long cirrostyles; ventral tentacular cirri of segment 2 flat and oval, with tapered distal end (Figure 10A). Tentacular cirri of first segment reaching setiger 4. Dorsal and ventral tentacular cirri of second segment reaching segments 5 and 2, respectively. Neuropodia and ventral cirri from third segment. Dorsal cirri absent on segment 3. Dorsal cirri symmetrical, with well-developed cirrophores, without dorsal extensions, present from segment 4. Dorsal cirri of anterior and median parapodia oval, cylindrical and slender on posterior segments. Lobes longer than dorsal cirri and shorter than ventral cirri. Prechaetal lobes bilobate, symmetrical and rounded. Postchaetal lobes rounded. Ventral cirri horizontally oriented in relation to lobes, from segment 3, conical, slender, with inflated bases on anterior segments; conical on median segments; cylindrical and slender on posterior segments (Figures 11A–D and 12A). Compound spinigerous chaetae from segment 3. Anterior and median parapodia with two supracicular and two subacicular bidentate chaetae. Posterior parapodia with five chaetae, two supracicular and three subacicular; four dorsalmost chaetae bidentate, lowermost chaeta unidentate. Articles of varied shape and with serrated outer edges (Figure 12B, C). Pygidium with one pair of cylindrical and slender anal cirri; pygidial papilla not observed.

COLOUR

Preserved specimens show a brownish pigmentation, more evident in parapodial cirri.

ETYMOLOGY

The species is named after Dr Cecília Amaral, one of the greatest contributors to the field of polychaete taxonomy in Brazil.

DISTRIBUTION

Atlantic Ocean, Brazil: Margin of continental shelf in Campos Basin.

REMARKS

Hesionura ceciliae sp. nov. shares the shape of the ventral tentacular cirri, oval with tapered distal ends, with *H. australiensis*. It differs from *H. laubieri* by the oval dorsal cirri and conical ventral cirri, with tapered distal ends, these being much shorter than the chaetae, whereas *H. laubieri* has cylindrical ventral cirri that are longer than the chaetae. It differs from *H. elongata* by the absence of simple chaetae and the shape of the parapodial cirri, which are cylindrical in the latter. It shares conical dorsal cirri with *H. coineaui difficilis* (Banse, 1963). *Hesionura ceciliae* sp. nov. differs from *H. biformata* sp. nov. and *H. australiensis*, both of which have long, conical ventral cirri. The shape of the dorsal cirri and the presence of a bidentate chaeta in the uppermost position on anterior and medium parapodia separates *Hesionura ceciliae* sp. nov. from *H. variodentata* sp. nov., *H. carioca* sp. nov., *H. lupina* sp. nov., *H. coineaui* (Laubier, 1962), *H. shandongensis* Zhao & Wu, 1991, *H. augeneri* (Friedrich, 1937) and *H. australiensis*. *Hesionura ceciliae* sp. nov. shares the presence of five chaetae in posterior parapodia with *H. biformata* sp. nov., *H. carioca*

sp. nov., *H. longissima* sp. nov., *H. lupina* sp. nov. and *H. australiensis*. *Hesionura ceciliae* sp. nov. differs from *H. biformata* sp. nov., *H. variodontata* sp. nov., *H. lupina* sp. nov. and *H. shandongensis* by the absence of a pygidial papilla.

Hesionura biformata sp. nov.
(Figures 13–16)

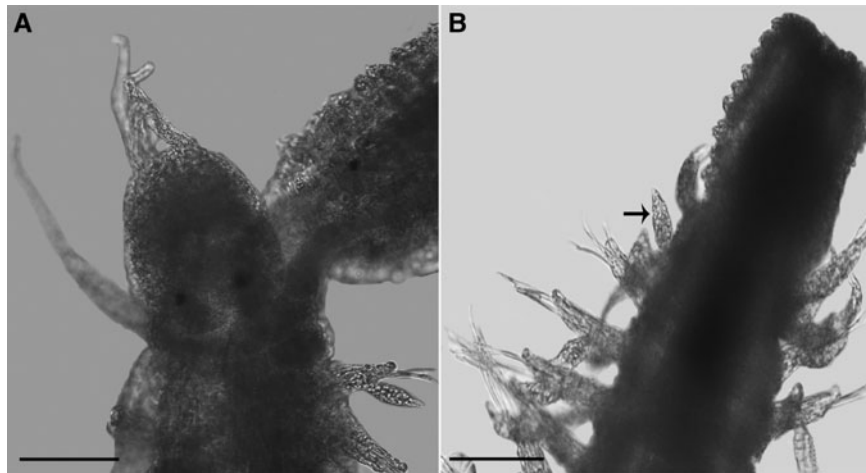


Fig. 13. *Hesionura biformata* sp. nov.: (A) Prostomium and anterior end of holotype, dorsal view; (B) Ventral view of partially everted proboscis in the holotype; ventral tentacular cirrus indicated by arrow. Scale bars: 0.05 mm.

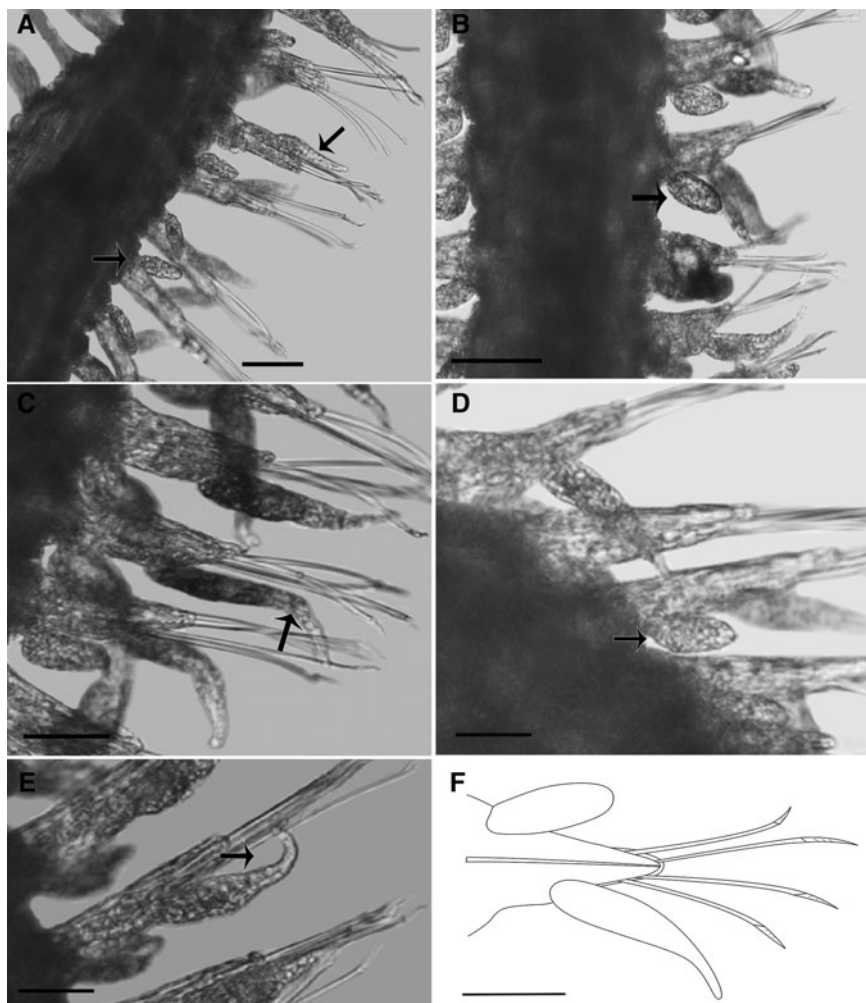


Fig. 14. *Hesionura biformata* sp. nov. Dorsal view of parapodia from the holotype: (A) Parapodium 5, ventral and dorsal cirrus (arrows); (B) Parapodium 25, dorsal cirrus (arrow); (C) Parapodium 25, ventral cirrus (arrow); (D) Parapodium 45, dorsal cirrus (arrow); (E) Parapodium 47, ventral cirrus (arrow); (F) Posterior view of median parapodium. Scale bars: 0.05 mm.

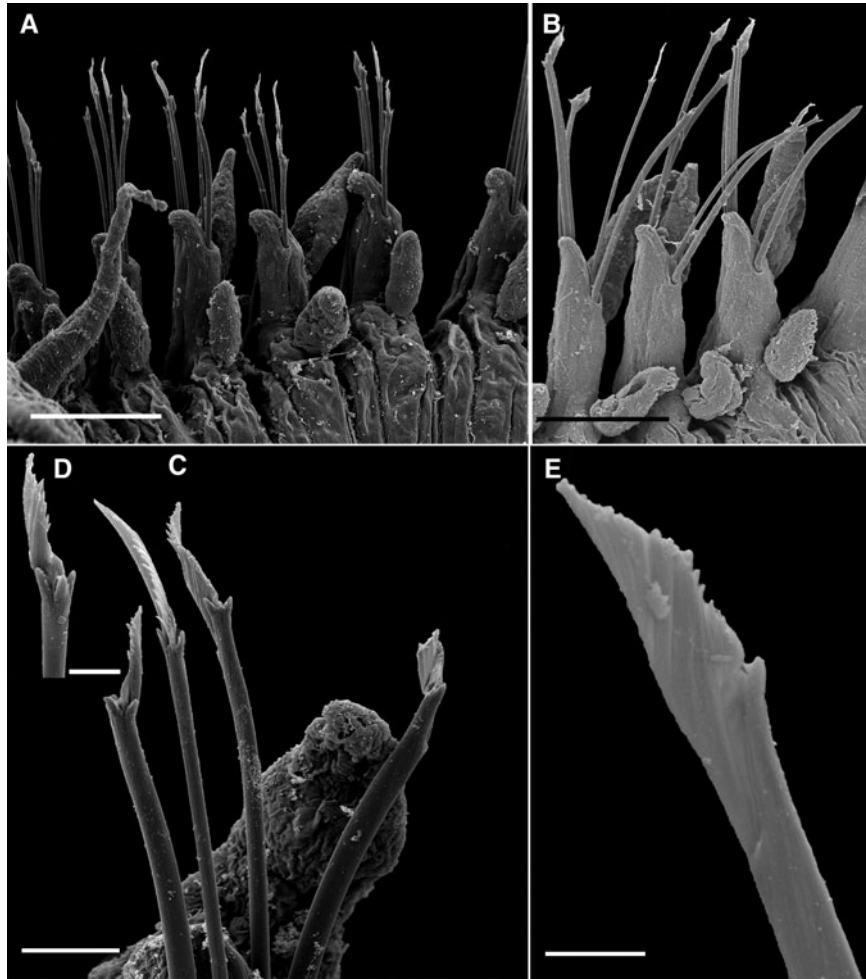


Fig. 15. *Hesionura biformata* sp. nov.: (A) Anterior parapodia, dorsal view, showing tridentate uppermost chaeta in each neuropodium, other chaetae bidentate; (B, C) Median parapodia, dorsal views, showing tridentate uppermost chaeta, two bidentate middle chaetae, and lowermost chaeta with one rounded tooth; (D) End of shaft and article of tridentate chaeta; (E) End of shaft and article of unidentate chaeta. Scale bars: A–B, 0.01 mm; C, 0.03 mm; D, 0.01 mm, E, 0.01 mm.

TYPE MATERIAL

Holotype. Margin of continental shelf in Campos Basin, Brazil, Hab13 Foz13 R2, $21^{\circ}33'54.457''S$ $42^{\circ}42'55.682''W$, 21 m, sandy bottom, 10 March 2009 (ZUEC–POL–17028). **Paratypes.** 20 paratypes, length from 2.0 to 3.2 mm and number of segments from 45 to 47. Continental shelf in Campos Basin, Brazil: Hab11 G2 R3, $21^{\circ}59'3.751''S$ $40^{\circ}25'10.170''W$, 52 m, 25 February 2009 (1 paratype, ZUEC–POL–17339); Hab11 Do2 R1, $22^{\circ}12'52.897''S$ $40^{\circ}51'12.067''W$, 52 m, 26 February 2009 (2 paratypes, ZUEC–POL–17023); Hab11 Do2 R3, $22^{\circ}12'53.401''S$ $40^{\circ}51'12.488''W$, 52 m, 26 February 2009 (1 paratype, ZUEC–POL–17033); Hab11 F01 R3, $21^{\circ}57'16.168''S$ $40^{\circ}37'59.616''W$, 26 m, 26 February 2009 (1 paratype, ZUEC–POL–17034); Hab13 Ho2 R2, $21^{\circ}44'19.348''S$ $40^{\circ}17'15.581''W$, 49 m, 9 March 2009 (3 paratypes, ZUEC–POL–17031); Hab13 Foz21 R1, $22^{\circ}6'21.254''S$ $40^{\circ}43'39.365''W$, 47 m, 12 March 2009 (2 paratypes, ZUEC–POL–17025); Hab13 Foz21 R1, $22^{\circ}6'21.254''S$ $40^{\circ}43'39.365''W$, 47 m, 12 March 2009 (1 paratype, ZMUC–POL–2411); Hab13 Foz21 R3, $22^{\circ}6'21.902''S$ $40^{\circ}43'39.494''W$, 47 m, 12 March 2009 (1 paratype, ZUEC–POL–17032); Hab16 F02 R2, $22^{\circ}3'41.650''S$ $40^{\circ}24'9.684''W$, 55 m, 6 July 2009 (3 paratypes, ZUEC–POL–17024); Hab16 F02 R3, $22^{\circ}3'41.650''S$ $40^{\circ}24'9.944''W$, 55 m, 6 July 2009 (2 paratypes, ZUEC–

POL–17029); Hab17 Foz10 R2, $21^{\circ}55'25.779''S$ $40^{\circ}49'12.029''W$, 21 m, 18 July 2009 (1 paratype, ZUEC–POL–17030); Hab17 Foz10 R3, $21^{\circ}55'25.907''S$ $40^{\circ}49'12.706''W$, 21 m, 18 July 2009 (1 paratypes, ZUEC–POL–17026); Hab17 Foz30 R3, $21^{\circ}34'12.552''S$ $40^{\circ}25'32.724''W$, 28 m, 23 July 2009 (1 paratype, ZUEC–POL–17022). Collected in sandy substrate, between 21 and 55 m.

DIAGNOSIS

Ventral cirri on median parapodia more than 1.5 times as long as the neuropodial lobes, abruptly tapering on posterior segments. Posterior parapodia with one bidentate and two unidentate subacicular chaetae.

DESCRIPTION

Holotype a complete specimen with 65 segments, 3.0 mm in length, measuring 0.1 mm wide at median part of body, including parapodia and excluding chaetae. Body long, very slender and tapered at posterior end. Prostomium elongated, much longer than wide, with antennae and palps inserted on a well-defined anterior protuberance. Antennae and palps conical and slender, of similar size, half as long as prostomium. One pair of eyes at posterior margin of prostomium (Figure 13A). Undivided proboscis covered with diffusely distributed



Fig. 16. *Hesionura biformata* sp. nov. Posterior end with anal cirri and pygidial papilla (arrow), ventral view. Scale bar: 0.05 mm.

conical papillae. Terminal ring not observed (Figure 13B). First segment visible dorsally. Tentacular cirri of segment 1 and dorsal tentacular cirri of segment 2 cylindrical, with short cirrophore and long cirrostyle (Figure 13A); ventral tentacular cirri of segment 2 with inflated base, tapering at distal end (Figure 13B). Tentacular cirri of first segment reaching setiger 4. Dorsal and ventral tentacular cirri of segment 2 reaching segments 5 and 2, respectively (Figure 13A). Neuropodia and ventral cirri present from third segment. Dorsal cirri absent on segment 3. Dorsal cirri symmetrical, with well-developed cirrophores, without dorsal extensions, from segment 4. Dorsal cirri of anterior parapodia cylindrical, with rounded distal ends on median segments and oval on posterior segments. Parapodial lobes longer than dorsal cirri and shorter than ventral cirri, with light-brown acicula. Prechaetal lobes bilobate and symmetrical. Postchaetal lobes rounded. Ventral cirri horizontally oriented in relation to lobes, from segment 3, cylindrical on anterior and median segments, slender and abruptly tapered on posterior segments (Figure 14A–E). Compound spinigerous chaetae from segment 3. Rostrum of chaetal shaft with one to three teeth. Anterior parapodia with two supracicular and two subacicular chaetae, uppermost one tridentate, the others bidentate. Median parapodia with most dorsal chaeta tridentate, second and third chaetae bidentate, and lowermost one unidentate. Posterior parapodia with two supracicular and three subacicular chaetae, three uppermost ones bidentate, two ventralmost ones unidentate; article with serrated outer edge (Figure 15A–D). Pygidium with one pair of cylindrical anal cirri; pygidial papilla present (Figure 16).

COLOUR

Preserved specimens are brownish, with pigment more concentrated on the dorsal cirri and at the base of the ventral cirri.

DISTRIBUTION

Atlantic Ocean, Brazil: Margin of continental shelf in Campos Basin.

ETYMOLOGY

The name of this species means ‘of two shapes’, specifically referring to the cylindrical ventral cirri that become abruptly filiform in posterior segments.

REMARKS

Hesionura biformata sp. nov. differs from *H. laubieri* and *H. elongata* by the length of the ventral cirri, which although long do not exceed the length of the chaetae, and by the presence of five chaetae in posterior parapodia, with the three dorsalmost ones being bidentate and the two ventralmost ones being unidentate. *Hesionura biformata* sp. nov. shares the oval shape of the dorsal cirri on posterior segments with that in *H. carioca* sp. nov. and *H. mystidoides* Hartmann-Schröder, 1963. It differs from *H. variodentata* sp. nov., *H. lupina* sp. nov. and *H. shandongensis* by having median ventral cirri cylindrical and slender, abruptly tapered on posterior segments. It shares the presence of cylindrical and slender ventral cirri on anterior segments with *Hesionura fragilis* Hartmann-Schröder, 1958. The presence of cylindrical dorsal cirri with distal rounded ends on anterior parapodia and the number of teeth on the chaetal rostra separates *H. biformata* sp. nov. from *H. ceciliae* sp. nov. As in *H. variodentata* sp. nov., *H. carioca* sp. nov., *H. lupina* sp. nov. and *H. australiensis*, the uppermost chaeta is tridentate on anterior and median parapodia.

Hesionura variodentata sp. nov. (Figures 17–19)



Fig. 17. *Hesionura variodentata* sp. nov. Prostomium and anterior end of holotype, ventral view; tentacular cirri of segment 1 and ventral tentacular cirri of segment 2 (arrow) in focus. Scale bar: 0.04 mm.

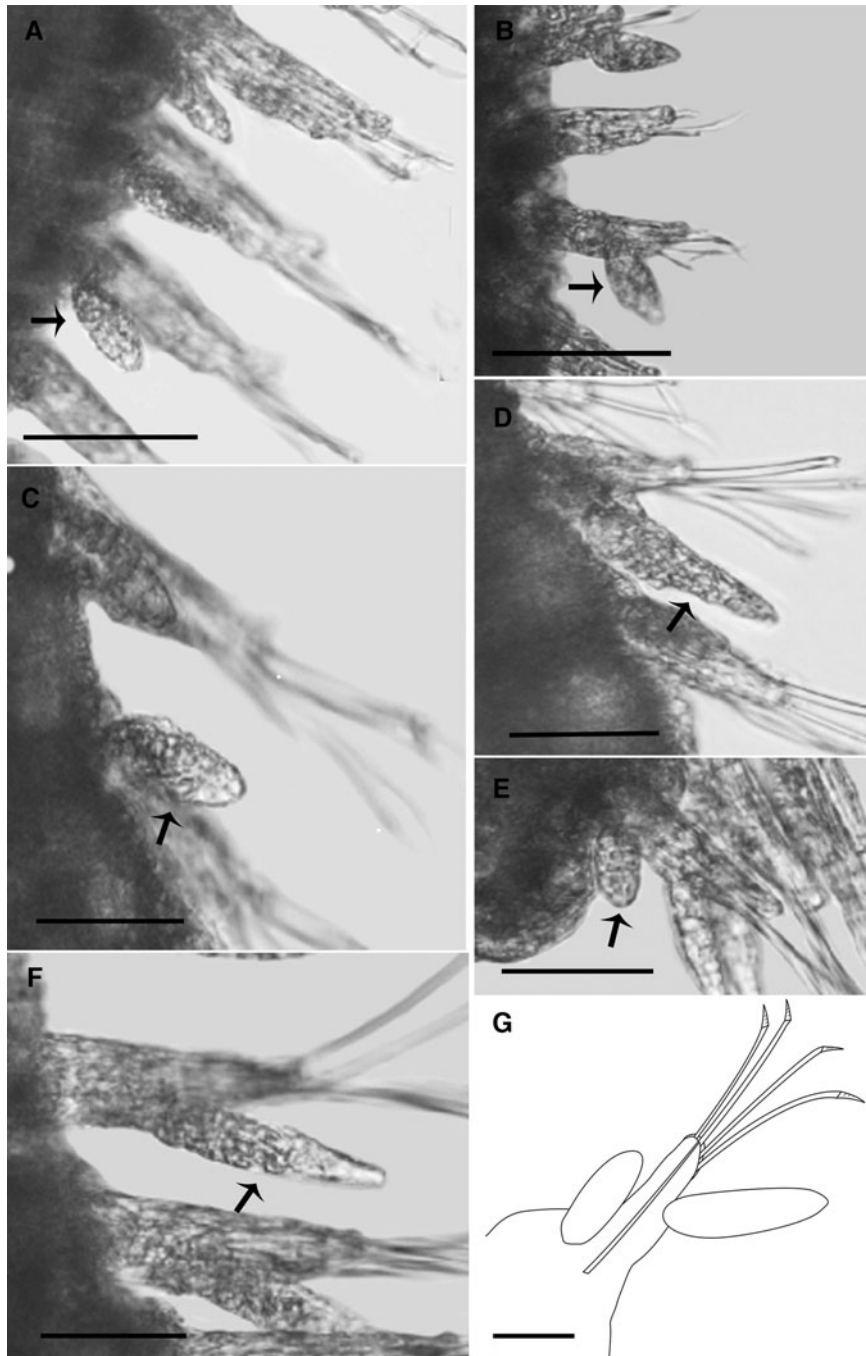


Fig. 18. *Hesionura variodontata* sp. nov. Dorsal view of parapodia of the holotype: (A) Parapodium 7, dorsal cirrus (arrow); (B) Parapodium 7, ventral cirrus (arrow); (C) Parapodium 35, dorsal cirrus (arrow); (D) Parapodium 35, cylindrical ventral cirrus (arrow); (E) Parapodium 70, dorsal cirrus (arrow); (F) Parapodium 67, ventral cirrus (arrow); (G) Posterior view of median parapodium. Scale bars: A–D; G, 0.05 mm; E, 0.02 mm; F, 0.03 mm.

TYPE MATERIAL

Holotype. Margin of continental shelf in Campos Basin, Brazil, Hab13 Io1 R2, $21^{\circ}11'0.839''S$ $40^{\circ}28'27.312''W$, 26 m, 5 March 2009 (ZUEC–POL–17035).

Paratypes. A total of 15 paratypes, length from 1.2 to 4.5 mm and number of segments from 47 to 94. Continental shelf in Campos Basin, Brazil: Hab13 Io1 R2, $21^{\circ}11'0.839''S$ $40^{\circ}28'27.312''W$, 26 m, 5 March 2009 (4 paratypes, ZUEC–POL–17036); Hab13 Ho1 R2, $21^{\circ}43'22.206''S$ $40^{\circ}31'52.366''W$, 26 m, 9 March 2009 (2 paratypes, ZMUC–POL–2412), Hab13 Bo1 R3, $22^{\circ}41'47.098''S$ $41^{\circ}53'$

$46.452''W$, 30 m, 16 March 2009 (7 paratypes, ZUEC–POL–17037); Hab17 Foz16 R1, $21^{\circ}12'15.019''S$ $40^{\circ}42'26.207''W$, 16 m, 22 July 2009 (1 paratype, ZUEC–POL–17038); Hab17 Foz16 R3, $21^{\circ}12'14.606''S$ $40^{\circ}42'27.627''W$, 15 m, 22 July 2009 (1 paratype, ZUEC–POL–17039). Collected in sandy substrates between 15 and 30 m.

DIAGNOSIS

Ventral tentacular cirri conical. Anterior and median parapodia with uppermost chaeta tridentate and other three chaetae

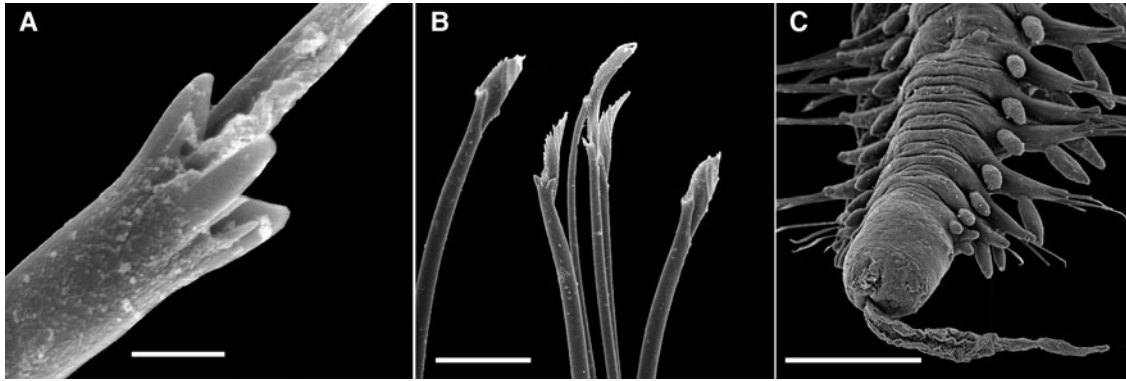


Fig. 19. *Hesionura variodentata* sp. nov.: (A) Dorsalmost chaeta from anterior parapodium; (B) Four compound spinigerous chaetae from posterior parapodium; (C) Pygidium with anal cirri and scar from pygidial papilla, dorsal view. Scale bars: A–B, 0.02 mm; C, 0.01 mm.

bidentate. Posterior parapodia with four chaetae, the three dorsalmost bidentate, the ventralmost one unidentate.

DESCRIPTION

Holotype a complete specimen with 65 segments, 4.5 mm long and 0.08 mm wide in median part of body, including parapodia and excluding chaetae. Body long, very slender and tapered at posterior end. Prostomium elongated, longer than wide, with antennae and palps inserted on a well-defined anterior protuberance (Figure 17). Antennae and palps cylindrical and slender, of similar size, half as long as prostomium. One pair of eyes at posterior margin of prostomium (Figure 17). Undivided proboscis covered with diffusely distributed conical papillae. Terminal ring not observed. First segment visible dorsally. Tentacular cirri of segment 1 and dorsal tentacular cirri of segment 2 cylindrical, with short cirrophore and long cirrostyle; ventral tentacular cirri of segment 2 with inflated base and distally tapered. Tentacular cirri of first segment reaching segment 4. Dorsal and ventral tentacular cirri of segment 2 reaching segments 5 and 3, respectively. Neuropodia and ventral cirri present from third segment. Dorsal cirri absent on segment 3. Dorsal cirri symmetrical, with well-developed oval cirrophore, without dorsal extension, from segment 4. Dorsal cirri oval, on median segments longer than on anterior and posterior segments. Parapodial lobes symmetrical, longer than dorsal cirri and shorter than ventral cirri, with light-brown acicula. Prechaetal lobe bilobate, symmetrical and rounded. Postchaetal lobe rounded. Ventral cirri horizontally oriented in relation to lobes, present from segment 3, conical on anterior segments, cylindrical with inflated base on median segments, elongate on posterior segments (Figure 18A–D). Compound spinigerous chaetae from segment 3. Rostrum of chaetal shaft with one to three teeth. All neuropodia with two supracicular and two subacicular chaetae; dorsalmost chaeta tridentate, the other three bidentate on anterior and median segments; on posterior segments three dorsalmost chaetae bidentate, lowermost chaeta unidentate. Articles of varied shape, with serrated outer edge (Figure 19A–B). Pygidium with one pair of cylindrical anal cirri. Pygidial papilla present (Figure 19C).

COLOUR

Preserved specimens are opaque.

DISTRIBUTION

Atlantic Ocean, Brazil: Margin of continental shelf in Campos Basin.

ETYMOLOGY

The name of this species refers to the varying dentition patterns in chaetae from posterior parapodia.

REMARKS

The presence of a median pygidial papilla has previously been reported only for *Hesionura shandongensis*, but it is herein also described in *H. variodentata* sp. nov., *H. biformata* sp. nov., *H. carioca* sp. nov. and *H. lupina* sp. nov. *Hesionura variodentata* sp. nov. differs from *H. laubieri*, *H. augeneri* and *H. australiensis* in the shape of the parapodial cirri. As in *H. laubieri* and in *H. longissima* sp. nov., only four chaetae are found in all neuropodia. *Hesionura variodentata* sp. nov. differs from *H. elongata* by the shape of the ventral cirri and by the absence of simple chaetae, as well as the number of teeth on the chaetal rostra, a character which also differentiates it from *H. ceciliae* sp. nov. It shares the presence of a tridentate dorsalmost supracicular chaeta in anterior and median parapodia with *H. biformata* sp. nov., *H. carioca* sp. nov., *H. lupina* sp. nov. and *H. australiensis*, but differs from them in having only four chaetae in posterior parapodia. *Hesionura variodentata* sp. nov. differs from *H. longissima* sp. nov. in the shape of the parapodial cirri and in the number of chaetal teeth in anterior and median parapodia (see Table 1).

Hesionura carioca sp. nov.
(Figures 20–22)

TYPE MATERIAL

Holotype. Margin of continental shelf in Campos Basin, Brazil, Hab17 Foz16 R1, 21°12'15.019"S 40°42'26.207"W, 16 m, sandy bottom, 22 July 2009 (ZUEC–POL–17040). Paratypes. 7 paratypes, length from 4.0 to 6.0 mm and number of segments from 70 to 90. Continental shelf in Campos Basin, Brazil: Hab13 Foz13 R2, 21°33'54.457"S 40°42'55.682"W, 21 m, 10 March 2009 (4 paratypes, ZUEC–POL–17042); Hab17 Foz18 R3, 21°33'54.611"S 40°42'53.901"W, 23 m, 20 July 2009 (1 paratype, ZUEC–POL–17041); Hab13 Foz18 R3, 21°33'54.611"S, 40°42'

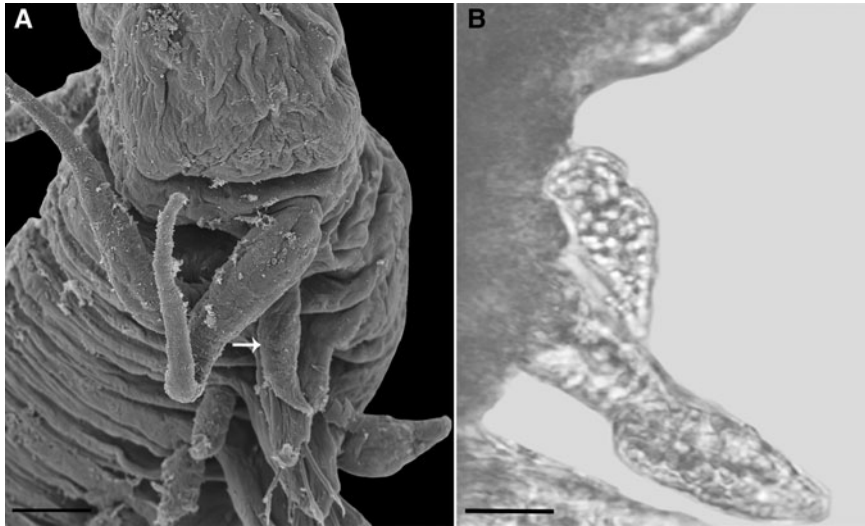


Fig. 20. *Hesionura carioca* sp. nov. (A) Anterior end, anterolateral view showing tentacular cirri of right side of body (ventral tentacular cirrus of segment 2 indicated by arrow); (B) Modified ventral cirri in mature specimen. Scale bars: 0.05 mm.

53.901°W, 23 m, 20 July 2009 (2 paratypes, ZMUC-POL-2413). Collected in sandy substrate, 21–23 m.

DIAGNOSIS

Ventral tentacular cirri cylindrical and relatively elongate with tapered distal end. Dorsal cirri oval. Posterior parapodia with one tridentate, three bidentate and one unidentate chaetae.

DESCRIPTION

Holotype a complete specimen with 68 segments, 5.0 mm long, and 0.09 mm wide at median part of body, including parapodia and excluding chaetae. Body long, very slender and tapered at posterior end. Prostomium elongated, longer than wide, antennae and palps inserted on well-delineated anterior protuberance. Antennae and palps conical and slender,

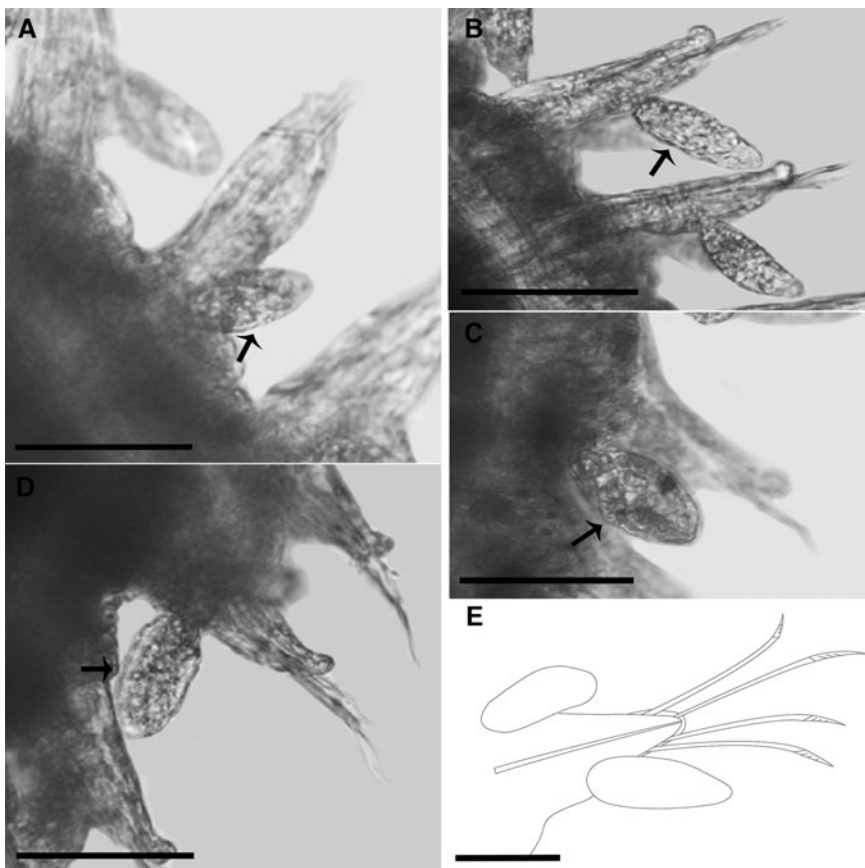


Fig. 21. *Hesionura carioca* sp. nov. Dorsal view of parapodia of the holotype: (A) Anterior parapodia, dorsal cirri oval (arrow); (B) Anterior parapodia, ventral cirri oval (arrow); (C, D) Median and posterior parapodia, dorsal cirri oval (arrow); (E) Posterior view of median parapodium. Scale bars: 0.05 mm.

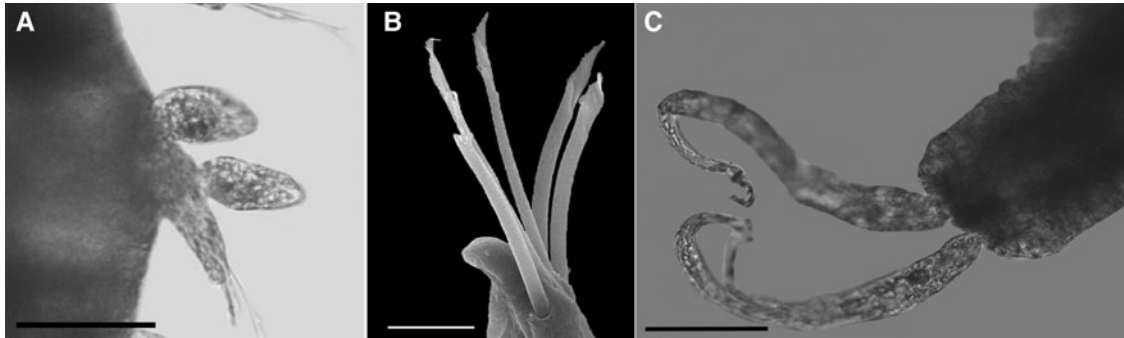


Fig. 22. *Hesionura carioca* sp. nov.: (A) Parapodia with oval cirri, holotype; (B) Chaetae of anterior parapodium; (C) Pygidium with pair of anal cirri, holotype. Scale bars: A, 0.03 mm; B, 0.05 mm; C, 0.5 mm.

of similar size, about as long as prostomium. One pair of eyes situated at posterior margin of prostomium. Undivided proboscis covered with diffusely distributed, conical papillae. Terminal ring of proboscis with conical papillae. First segment visible dorsally. Tentacular cirri of segment 1 and dorsal tentacular cirri of segment 2 cylindrical, with short cirrophore and long cirrostyle; ventral tentacular cirri of segment 2 with inflated base, distally tapered. First pair of tentacular cirri reaching segment 3. Dorsal and ventral tentacular cirri of segment 2 reaching segments 3 and 5, respectively (Figure 20A, B). Neuropodia and ventral cirri present from segment 3. Dorsal cirri absent on segment 3. Dorsal cirri symmetrical and oval, with well-developed cirrophores, without dorsal extensions, from segment 4. Dorsal cirri more elongate on anterior neuropodia, more robust on median neuropodia, and more rounded on posterior segments. Parapodial lobes longer than dorsal and shorter than ventral cirri, with light-brown acicula. Prechaetal lobes bilobate, rounded. Postchaetal lobes rounded. Ventral cirri horizontally oriented in relation to lobes from segment 3 on, with round distal end, on anterior segments cylindrical, on median segments cylindrical and slender, on posterior segments more rounded (Figure 21A–D). The parapodial cirri modified to rounded during the reproductive stage (Figure 21D). Compound spinigerous chaetae from segment 3. Rostrum of chaetal shaft with one to three teeth. Anterior and median parapodia with two supracircular and two subacircular chaetae, dorsalmost chaeta tridentate, the other three bidentate. Posterior parapodia with five chaetae, two supracircular and three subacircular, dorsalmost chaeta tridentate, lowermost chaeta unidentate, the three others bidentate. Articles of varied shape, with serrated outer edge (Figure 22A). Pygidium with one pair of long cylindrical anal cirri. Pygidial papilla present (Figure 22B).

COLOUR

Preserved specimens are opaque.

DISTRIBUTION

Atlantic Ocean, Brazil: margin of the continental shelf in Campos Basin.

ETYMOLOGY

The species name honours the people from the beautiful city of Rio de Janeiro.

REMARKS

Hesionura carioca sp. nov., and *H. longissima* sp. nov. share the rounded shape of the parapodial cirri, modified during the reproductive stage. *Hesionura carioca* sp. nov. differs from *H. laubieri* and *H. elongata* by the presence of long, cylindrical ventral tentacular cirri, the shape and length of the dorsal and ventral cirri, as well as by the number of teeth on the rostrum of chaetae in anterior and medium parapodia. As in *Hesionura biformata* sp. nov., *H. variodontata* sp. nov., *H. lupina* sp. nov. and *H. coineaui*, the dorsalmost chaeta is tridentate on anterior and median neuropodia. *Hesionura carioca* sp. nov. shares the presence of a pygidial papilla with *H. variodontata* sp. nov., *H. biformata* sp. nov., *H. lupina* sp. nov. and *H. shandongensis*. *Hesionura carioca* sp. nov. differs from *H. ceciliae* sp. nov. in the shape of the parapodial cirri and in the number of teeth on the dorsalmost chaeta throughout the body (tridentate and bidentate, respectively).

Hesionura longissima sp. nov.

(Figures 23–26)

TYPE MATERIAL

Holotype. Margin of continental shelf in Campos Basin, Brazil, Hab17 Foz25 R1, 21°39′32.551″S 40°31′124.888″W, 28 m, 23 July 2009 (ZUEC–POL–17044).

Paratypes. A total of 53 paratypes, length from 4.0 to 21 mm and number of segments from 80 to 198. Continental shelf in Campos Basin, Brazil: Hab11 Foz2 R1, 22°3′41.155″S 40°24′9.910″W, 56 m, 25 February 2009 (1 paratype, ZUEC–POL–17049); Hab13 Io1 R3, 21°11′0.915″S 40°28′27.114″W, 26 m, 5 March 2009 (17 paratypes, ZUEC–POL–17045); Hab13 Ho1 R3, 21°43′22.256″S 40°31′52.229″W, 26 m, 9 March 2009 (7 paratypes, ZUEC–POL–17053); Hab13 Foz24 R3, 21°50′20.898″S 40°31′39.721″W, 27 m, 13 March 2009 (10 paratypes, ZUEC–POL–17054); Hab13 Foz31 R1, 21°45′2.021″S 40°25′45.245″W, 26 m, 13 March 2009 (1 paratype, ZMUC–POL–2414); Hab16 Foz31 R3, 21°45′2.157″S 40°25′45.051″W, 25 m, 9 July 2009 (1 paratype, ZUEC–POL–17046); Hab17 Foz03 R1, 21°28′2.071″S 40°56′16.956″W, 15 m, 20 July 2009 (2 paratypes, ZMUC–POL–2415); Hab17 Foz18 R1, 21°33′54.340″S 40°42′55.771″W, 23 m, 20 July 2009 (2 paratypes, ZUEC–POL–17051); Hab17 Foz29 R1, 21°24′45.072″S 40°25′17.287″W, 26 m, 21 July 2009 (1 paratype, ZUEC–POL–17043); Hab17 Foz04 R3, 22°23′22.230″S, 40°34′59.116″W, 110 m,

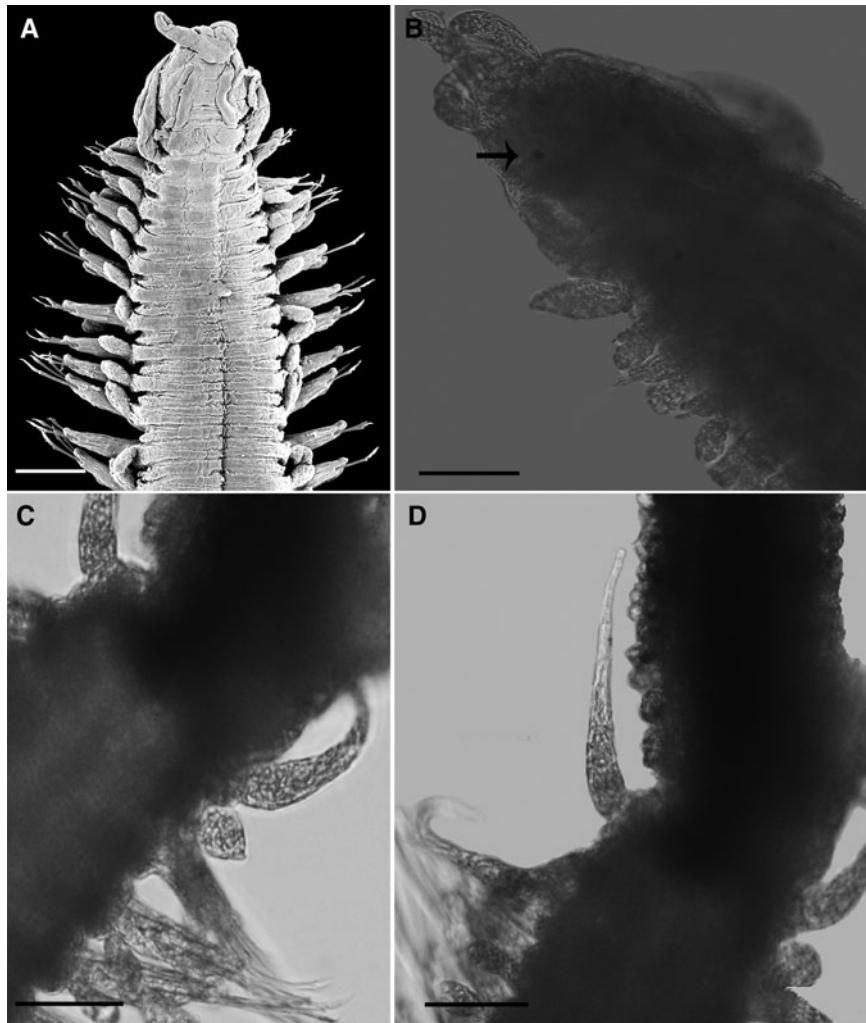


Fig. 23. *Hesionura longissima* sp. nov.: (A) Anterior end, dorsal view, paratype; (B) Prostomium, dorsal view; (C) Anterior segments, ventral view, note ventral tentacular cirrus at the right; (D) Anterior segments, ventral view, note tentacular cirrus of segment 1 at the left. (B–D), holotype. Scale bars: A, 0.05 mm; B, 0.2 mm; C–D, 0.05 mm.

25 July 2009 (2 paratypes, ZMUC–POL–2416); Hab17 I01 R1, 21°11'0.342"S 40°28'28.313"W, 26 m, 21 July 2009 (1 paratype, ZUEC–POL–17050); Hab17 Foz24 R1, 21°50'21.049"S 40°31'37.376"W, 28 m, 23 July 2009 (5 paratypes, ZUEC–POL–17052); Hab17 Foz24 R2, 21°50'20.997"S 40°31'38.672"W, 28 m, 23 July 2009 (1 paratype, ZUEC–POL–17047); Hab17 Foz30 R2, 21°34'13.655"S 40°25'31.571"W, 28 m, 23 July 2009 (1 paratype, ZUEC–POL–17048); Hab17 Do4 R1, 22°23' 22.230"S 40°34'59.116"W, 110 m, 25 July 2009 (1 paratype, ZMUC–POL–2417). In very thick sandy bottoms, between 15 and 110 m.

DIAGNOSIS

Parapodia with dorsalmost supracircular chaeta quadridentate. Adults with long body, up to 21 mm, usually with about 200 segments. Dorsal and ventral cirri rounded in reproductive stages.

DESCRIPTION

Holotype a complete specimen, with 198 segments and 21 mm in length, 0.29 mm wide at median part of body, including parapodia and excluding chaetae. Body long, very slender and tapered at posterior end. Prostomium elongated,

antennae and palps inserted on well-defined anterior protuberance. Antennae and palps conical and slender, of similar size, half as long as prostomium. One pair of eyes on median region of prostomium (Figure 23B). Undivided proboscis covered with diffusely distributed conical papillae. Terminal ring of proboscis with conical papillae (Figure 23D). First segment visible dorsally. Tentacular cirri of segment 1 and dorsal tentacular cirri of segment 2 cylindrical, with short cirrophore and long cirrostyle; ventral tentacular cirri of segment 2 oval to elongate. Tentacular cirri of first segment reaching segment 4. Dorsal and ventral tentacular cirri of segment 2 reaching segments 5 and 3, respectively (Figure 23A). Neuropodia and ventral cirri present from segment 3. Dorsal cirri absent on segment 3. Dorsal cirri symmetrical and oval, with well-developed cirrophores, without dorsal extensions, from segment 4. Median dorsal cirri longer than anterior and posterior ones. In sexually mature animals, dorsal cirri of anterior parapodia oval, on median and posterior segments rounded, median ones more robust than posterior ones. Parapodial lobes longer than dorsal cirri and similar length ventral cirri in reproductive stage, with light-brown acicula. Parapodial lobes longer than dorsal and shorter than ventral cirri in reproductive stage,

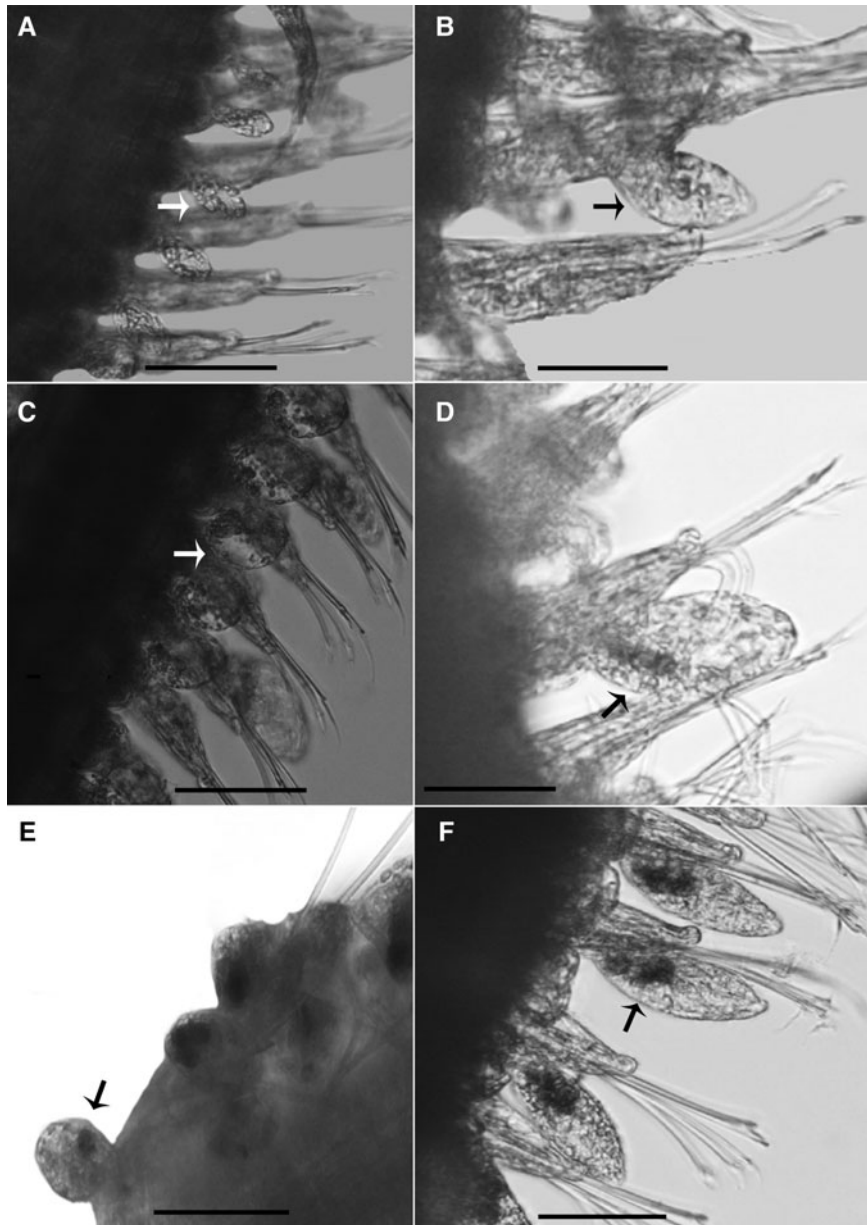


Fig. 24. *Hesionura longissima* sp. nov. Holotype: (A) Anterior parapodia, dorsal cirri (arrow); (B) Anterior parapodia, ventral cirri (arrow); (C) Median parapodia, dorsal cirri (arrow); (D–F) Median and posterior parapodia, ventral cirri (arrow). Scale bars: A–F, 0.05 mm.

which is a unique feature in *Hesionura*. Prechaetal lobes bilobate, rounded. Postchaetal lobes rounded. Ventral cirri symmetrical and oval, horizontally oriented in relation to lobes, present from segment 3, more robust on median segments and thinner on posterior segments (Figures 24A–F & 25A–D). Compound spinigerous chaetae from segment 3. Rostrum of chaetal shaft with one to four teeth. Two supracircular chaetae, dorsalmost one quadridentate, second one tridentate, and two subacicular bidentate chaetae, with exception of last 15 segments, which have the three dorsalmost chaetae bidentate and the ventralmost unidentate. Articles with serrated outer edge (Figure 26A, B). Pygidium with one pair of cylindrical anal cirri; pygidial papilla not observed.

COLOUR

Preserved specimens are opaque.

DISTRIBUTION

Atlantic Ocean, Brazil: Margin of continental shelf in Campos Basin.

ETYMOLOGY

The name of this species refers to the exceptional length of specimens in relation to congeneric species.

REMARKS

Hesionura longissima sp. nov. displays rounded dorsal and ventral tentacular cirri in mature animals. Such modifications are shared with *H. carioca* sp. nov. (Figures 24C & 25B–D). This type of epitoky was previously unknown for *Hesionura*. *Hesionura longissima* differs from other species of the genus by the presence of oval to rounded dorsal and ventral cirri and the presence of a quadridentate chaeta in the dorsalmost

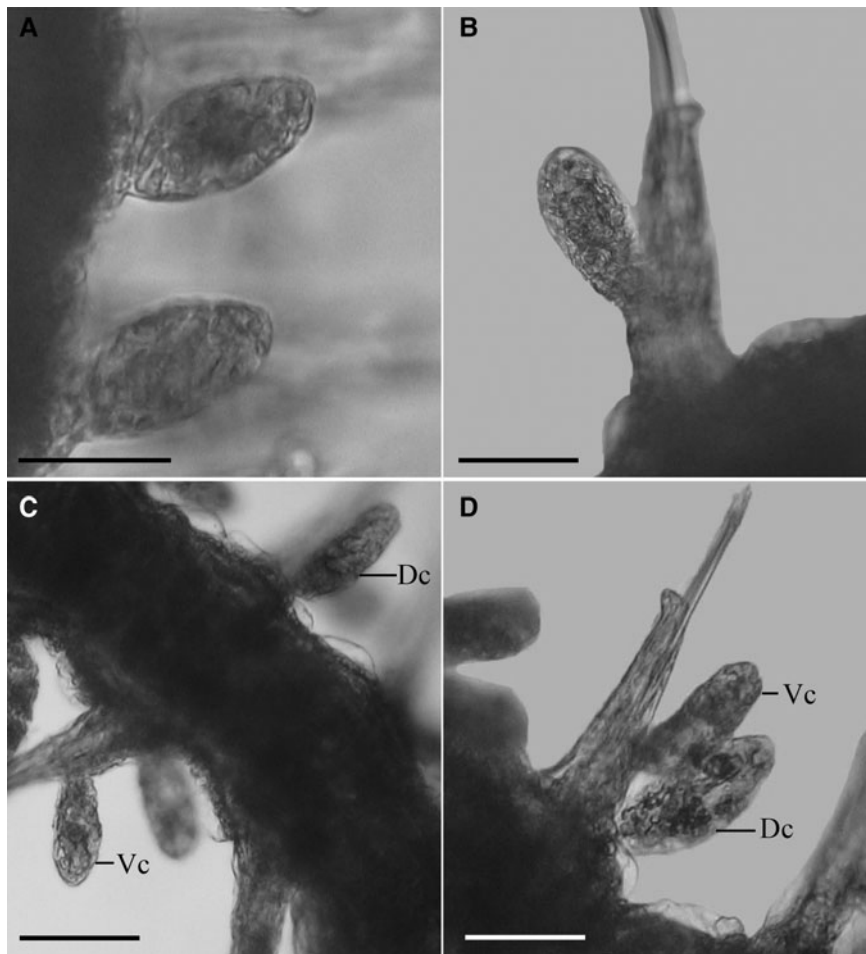


Fig. 25. *Hesionura longissima* sp. nov. (A) Anterior parapodia, dorsal cirri; (B) Anterior parapodium, ventral cirrus; (C) Median parapodia, dorsal and ventral cirri; (D) Posterior parapodium, dorsal and ventral cirri. DC, Dorsal cirrus; VC, Ventral cirrus. Scale bars: A, 0.02; B–D, 0.05 mm.

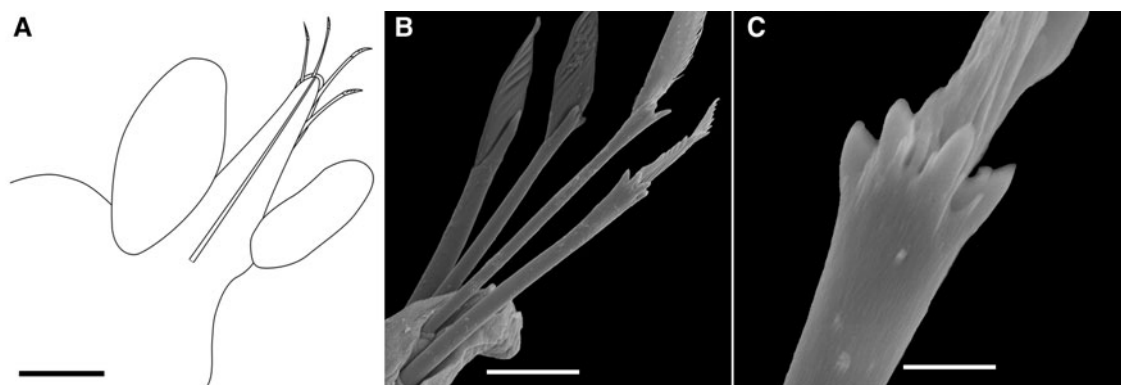


Fig. 26. *Hesionura longissima* sp. nov. (A) Posterior view of median parapodium; (B) Compound spinigerous chaetae; (C) Quadridentate supracircular compound chaeta. Scale bars: A, 0.05 mm; C–B, 0.01 mm.

position throughout the body, except in the last 20 segments, as well as by the length of the body, which may reach 21 mm in adults. It clearly differs from *Hesionura elongata*, which has capillary chaetae and fusiform dorsal cirri, and from *H. coineaui*, *H. variodentata* sp. nov., *H. serrata* and *H. ceciliae* sp. nov. in the shape of the ventral cirri. The presence of five chaetae in the posterior parapodia separates *H. longissima* sp. nov. from *H. laubieri*, *H. australiensis* and *H. variodentata*

sp. nov., all of which have four chaetae in posterior parapodia. *Hesionura longissima* sp. nov. also differs from *H. variodentata* sp. nov., *H. carioca* sp. nov. and *H. shandongensis* by the absence of a pygidial papilla.

Hesionura lupina sp. nov.
(Figures 27–29)

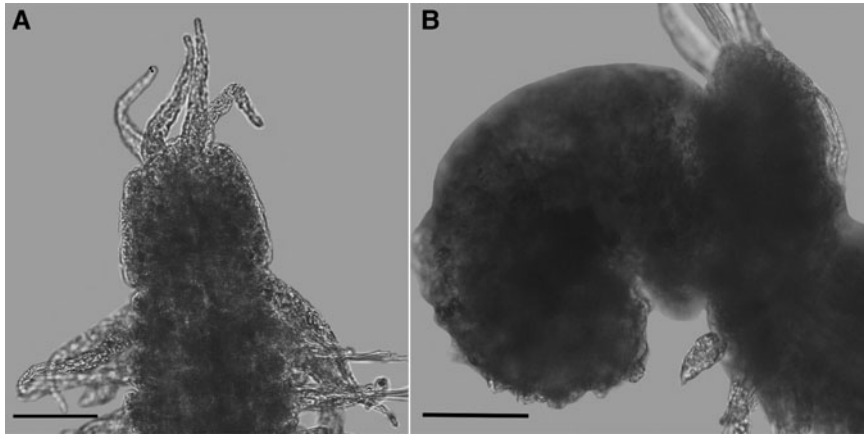


Fig. 27. *Hesionura lupina* sp. nov. Anterior end, holotype: (A) Dorsal view of the prostomium; (B) Dorsolateral view, ventral tentacular cirrus visible on left side of animal. Scale bars: A, 0.1 mm; B, 0.07 mm.

TYPE MATERIAL

Holotype. Margin of continental shelf in Campos Basin, Brazil, Hab13 Foz19 R2, $21^{\circ}44'42.969''\text{S}$ $40^{\circ}43'8.347''\text{W}$, 21 m, 11 March 2009 (ZUEC-POL-17061).

Paratypes. 75 paratypes, length from 2.4 to 4.2 mm and number of segments from 42 to 88. Continental shelf in Campos Basin, Brazil: Hab11 Do2 R1, $22^{\circ}12'52.897''\text{S}$ $40^{\circ}51'12.067''\text{W}$, 52 m, 26 February 2009 (2 paratypes, ZUEC-POL-17070); Hab13 Foz29 R3, $21^{\circ}24'43.736''\text{S}$ $40^{\circ}25'18.618''\text{W}$, 33 m, 7 March 2009 (1 paratype, ZUEC-POL-17074); Hab13 Foz18 R2, $21^{\circ}33'54.457''\text{S}$ $40^{\circ}42'55.682''\text{W}$, 22 m, 10 March 2009 (5 paratypes, ZUEC-POL-17076); Hab13 Foz18 R2, $21^{\circ}33'54.457''\text{S}$ $40^{\circ}42'$

$55.682''\text{W}$, 22 m, 10 March 2009 (3 paratypes, ZUEC-POL-17073); Hab13 Foz18 R3, $21^{\circ}33'53.089''\text{S}$ $40^{\circ}42'55.610''\text{W}$, 21 m, 10 March 2009 (7 paratypes, ZUEC-POL-17075); Hab13 Foz19 R1, $21^{\circ}44'42.879''\text{S}$ $40^{\circ}43'9.193''\text{W}$, 22 m, 11 March 2009 (4 paratypes, ZUEC-POL-17067); Hab13 Foz10 R2, $21^{\circ}55'25.160''\text{S}$ $40^{\circ}49'12.284''\text{W}$, 21 m, 12 March 2009 (1 paratype, ZUEC-POL-17071); Hab13 Foz30 R3, $21^{\circ}34'12.597''\text{S}$ $40^{\circ}25'31.241''\text{W}$, 29 m, 13 March 2009 (13 paratypes, ZUEC-POL-17068); Hab13 Foz31 R2, $21^{\circ}45'2.154''\text{S}$ $40^{\circ}25'44.878''\text{W}$, 26 m, 13 March 2009 (1 paratype, ZUEC-POL-17062); Hab13 Foz31 R2, $21^{\circ}45'2.154''\text{S}$ $40^{\circ}25'44.878''\text{W}$, 26 m, 13 March 2009 (1 paratype, ZUEC-POL-17065); Hab13 Foz41 R1, $21^{\circ}45'14.261''\text{S}$

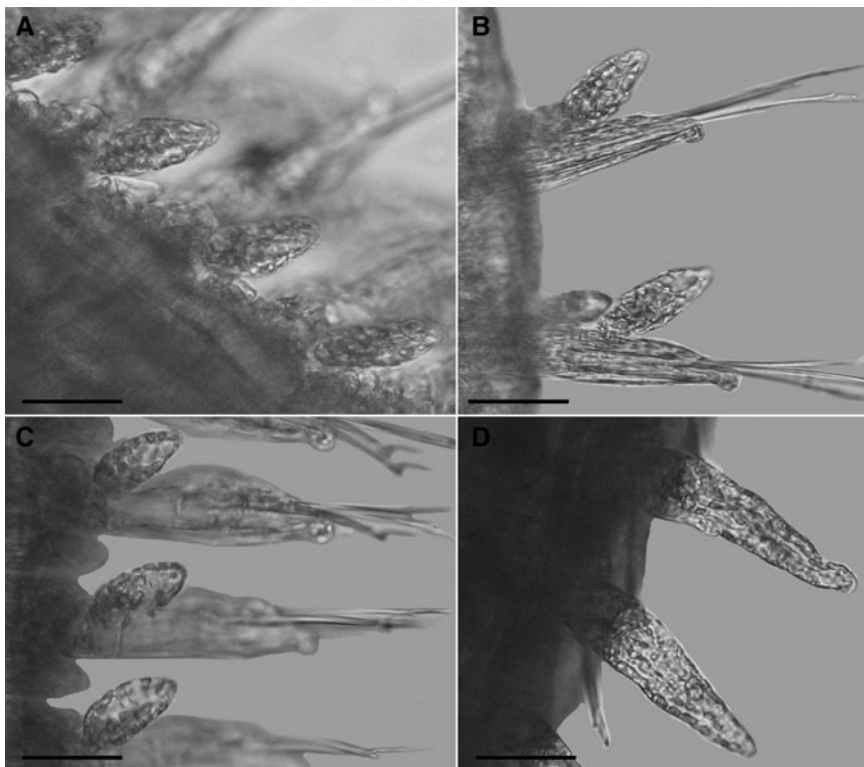


Fig. 28. *Hesionura lupina* sp. nov. Dorsal views of the parapodia in the holotype: (A) Anterior parapodia with dorsal cirri in focus; (B) Anterior parapodia with ventral cirri in focus; (C) Median parapodia with dorsal cirri in focus; (D) Median parapodia with ventral cirri in focus. Scale bars: 0.05 mm.

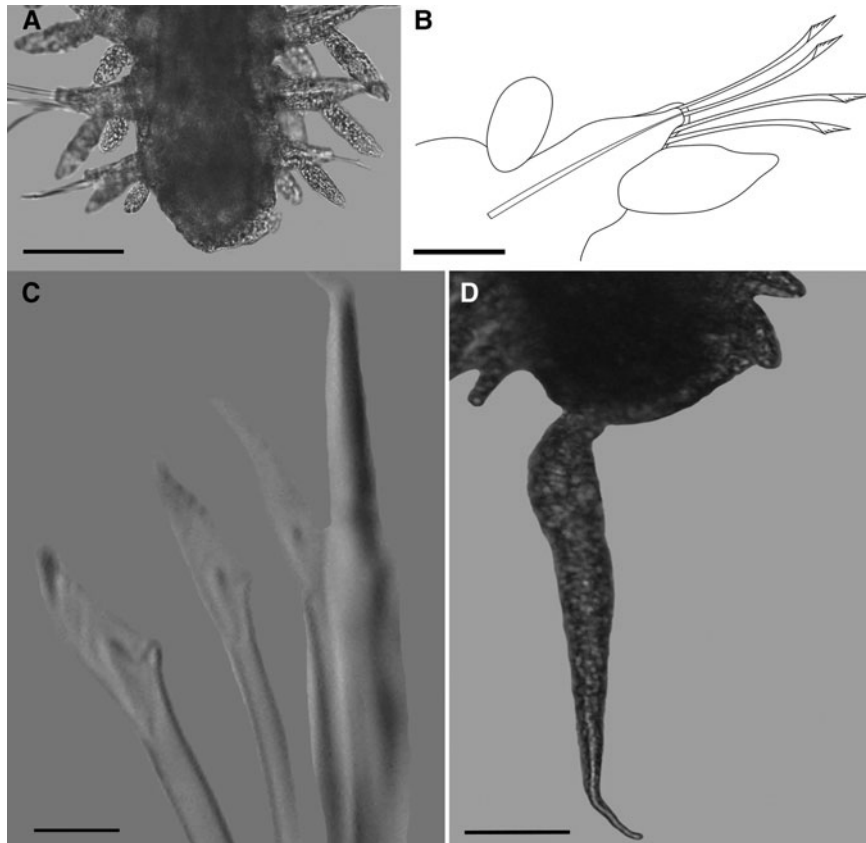


Fig. 29. *Hesionura lupina* sp. nov.: (A) Posterior parapodia with dorsal and ventral cirri, dorsal view, holotype; (B) Posterior view of median parapodium (C) Chaetae from posterior parapodium; (D) Anal cirrus, holotype (one anal cirrus lost). Scale bars: A–B, 0.05 mm; C, 0.01 mm; D, 0.2 mm.

40°14'7.911''W, 67 m, 14 March 2009 (1 paratype, ZUEC-POL-17064); Hab16 G02 R1, 21°59'3.657''S 40°25'11.070''W, 52 m, 6 July 2009 (1 paratype, ZUEC-POL-17069); Hab16 Foz31 R1, 21°45'2.327''S, 40°25'45.451''W, 27 m, 9 July 2009 (15 paratypes, ZMUC-POL-2418); Hab17 Foz13 R3, 21°28'21.692''S 40°48'34.086''W, 22 m, 20 July 2009 (1 paratype, ZUEC-POL-17078); Hab17 Foz18 R2, 21°33'54.232''S 40°42'55.434.280''W, 23 m, 20 July 2009 (1 paratype, ZUEC-POL-17063); Hab13 Foz27 R3, 21°28'2.200''S 40°31'0.169''W, 30 m, 22 July 2009 (11 paratypes, ZMUC-POL-2419); Hab13 Foz25 R1, 21°39'31.133''S 40°56'21.516''W, 28 m, 23 July 2009 (3 paratypes, ZMUC-POL-2420); Hab17 Foz24 R3, 21°50'20.765''S 40°31'38.459''W, 28 m, 23 July 2009 (1 paratype, ZUEC-POL-17072); Hab17 Foz25 R1, 21°39'32.551''S 40°31'24.888''W, 28 m, 23 July 2009 (3 paratypes, ZUEC-POL-17066). Collected in sandy bottoms, between 21 and 67 m.

DIAGNOSIS

Ventral tentacular cirri of segment 2 cylindrical with inflated base and tapered distal end. Ventral cirri cylindrical and elongate, on median and posterior segments robust, median ones more elongate than posterior ones. Posterior parapodia with one tridentate and four bidentate chaetae.

DESCRIPTION

Holotype a complete female with 134 segments and 4.0 mm in length, 0.03 mm wide at median part of body, including

parapodia and excluding chaetae. Body long, cylindrical and tapered at posterior end. Prostomium elongated, antennae and palps inserted on well-defined anterior protuberance. Antennae and palps conical and slender, of similar size, half as long as prostomium. One pair of eyes at posterior margin of prostomium (Figure 27A). Undivided proboscis covered with diffusely distributed, conical papillae. Terminal ring of proboscis with conical papillae. First segment visible dorsally. Tentacular cirri of segment 1 and dorsal tentacular cirri of segment 2 cylindrical, with short cirrophore and long cirrostyle; ventral tentacular cirri of segment 2 with inflated base and tapered distal end. Tentacular cirri of first segment reaching segment 4. Dorsal and ventral tentacular cirri of segment 2 reaching segments 1 and 4, respectively (Figure 27A, B). Neuropodia and ventral cirri present from segment 3. Dorsal cirri symmetrical and cylindrical, with well-developed cirrophores without dorsal extensions, from segment 4, more robust on anterior segments, shorter on median segments, and with more rounded distal end on posterior segments. Parapodial lobes longer than dorsal cirri and shorter than ventral cirri, with light-brown acicula. Prechaetal lobes bilobate and rounded. Postchaetal lobes rounded. Ventral cirri horizontally oriented in relation to parapodial lobes, with rounded distal end, cylindrical and more robust on anterior segments, longer and more slender on posterior segments (Figure 28A–D). Compound spinigerous chaetae from segment 3. Shafts of chaetae with two or three teeth. Anterior and median parapodia with two supraciculate and two subaciculate chaetae, dorsalmost one tridentate, other

three bidentate. Posterior parapodia with five chaetae, two supracicular and three subacicular, dorsalmost chaeta tridentate, other four bidentate; articles with serrated outer edge (Figure 29C). Pygidium with one pair of cylindrical, long anal cirri (Figure 29D). Pygidial papilla present (Figure 29B).

COLOUR

Preserved specimens are opaque.

DISTRIBUTION

Atlantic Ocean, Brazil: Margin of continental shelf in Campos Basin.

ETYMOLOGY

This species is named after our friend and colleague, the late José María Orensanz (affectionately known as Lobo, sea-wolf).

REMARKS

Hesionura lupina sp. differs from *H. carioca* sp. nov. and *H. longissima* sp. nov. in the shape of the parapodial cirri, which are rounded in the reproductive stages in the latter. It shares a similar shape of ventral tentacular cirri with *H. longissima* sp. nov. and *H. mystidoides*, but differs from them by the cylindrical dorsal cirri. *Hesionura lupina* sp. nov. shares cylindrical and elongate dorsal and ventral cirri with *H. laubieri* and *H. elongata*. Having the uppermost chaeta tridentate in anterior parapodia is a character shared with *H. biformata* sp. nov., *H. variodentata* sp. nov., *H. carioca* sp. nov. and *H. coineaui*. *Hesionura lupina* sp. nov., *H. biformata* sp. nov. and *H. carioca* sp. nov. have a pygidial papilla similar to that of *H. shandongensis*. The number of teeth on the chaetal rostrum in anterior and posterior parapodia is similar to those in *H. carioca* sp. nov., except for the lowermost chaeta in posterior parapodia, which in *H. lupina* sp. nov. is bidentate and in *H. carioca* sp. nov. unidentate.

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