Atlantiphoxus wajapi n. gen., n. sp. (Crustacea: Amphipoda: Phoxocephalidae), a new deep-sea amphipod from the southwestern Atlantic

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Summary: A new genus and species of the family Phoxocephalidae is here described with material collected during the Mini Biological Trawl Project at 224 and 500 m depth off Brazil’s southeastern coast in the states of Rio de Janeiro and São Paulo. Atlantiphoxus wajapi n. gen., n. sp. can be grouped in the subfamily Phoxocephalinae and seems to be morphologically close to Fuegiphoxus Barnard and Barnard, 1980 and Parharpinia Stebbing, 1899. However it can be easily distinguished within the phoxocephalids by the following characters: deep pereonites with small coxae; rostrum unconstricted; eyes absent; mandible molar not triturative, but as a small hump with 3 multicuspidate stout setae; pereopods 3-4 with stout dactylus; pereopod 5 basis strongly tapering distally; pereopod 7 basis anterodistal corner with a row of long plumose setae; dactylus elongate. Epimeral plate 3 posteroverentral margin strongly produced.

Keywords: Amphipoda; taxonomy; SW Atlantic; Brazil; new species; new genus.

INTRODUCTION

Phoxocephalidae Sars, 1891 is a marine benthic family living mostly buried within the substrate and comprising about 365 species grouped into 80 genera (Barnard and Drummond 1978, Horton et al. 2019). It is widely distributed bathymetrically and most of its diversity can be found in the Southern Hemisphere deep
sea (Hartman 1955, Alonso de Pina et al. 2008, Senna 2010). The family is the fifth most speciose amphipod taxa (Arfianti et al. 2018) and can be distinguished by the following characters: head with visor-like rostrum, not cylindrical; antennae 1-2 of haustorioid form, with multiarticulate accessory flagellum; gnathopods 1-2 subchelate or chelate; pereopod 6 usually elongate; not cylindrical; antennae 1-2 of haustorioid form, with the following characters: head with visor-like rostrum, taxa (Arfianti et al. 2018) and can be distinguished by 2010). The family is the fifth most speciose amphipod sea (Hartman 1955, Alonso de Pina et al. 2008, Senna

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In the past, the genera of Phoxocephalidae were grouped into nine subfamilies by Barnard and Drummond (1978). Over time, the status and establishment of new subfamilies were proposed and discussed to solve some questions regarding divergences between the genera (Gurjanova 1977, Barnard and Karaman 1991, Jarret and Bousfield 1994a, b). However, through cladistic analysis, Taylor and Poore (2001) failed to obtain support for the monophyly of the proposed subfamilies. According to Alonso de Pina et al. (2008), Barnard and Drummond’s division of subfamilies must not be recognized until new phylogenetic studies are done.

The current classification of Phoxocephalidae is based on purely morphological criteria (De Broyer et al. 2007, Senna and Souza-Filho 2011, Lowry and Myers 2017), grouping all genera into two subfamilies: Harpiniinae Barnard and Drummond, 1978, diagnosed mainly by pereopod 5 with a narrow basis; and Phoxocephalinae Sars, 1891, characterized by pereopod 5 with a stout basis. Although we follow the most recent classification within the family, the World Amphipoda Database (Horton et al. 2019) continues to use the classical division using the old subfamilies. As recent authors have been accepting only two subfamilies (Andrade and Senna 2019a, b, 2020), it is suggested that the current classification should be updated in the database. The establishment of a new genus can be somewhat problematic, especially in the family Phoxocephalidae. Taylor (2006) noticed this issue and highlighted the past works within the family when several new genera were established based on recombinations of known characters instead of newly or advanced ones, raising the number of monotypic genera. Furthermore, many species achieve the status of a genus or subfamily due to a few unusual characteristics, resulting in several paraphyletic taxa.

Atlantiphoxus n. gen. seems to be close to the genus Parharpinia fuciens Schellenberg, 1931 as the type species. In the same work, the authors described F. abjectus Barnard and Barnard, 1980, F. inutilus Barnard and Barnard, 1980, and Pontharpinia uncinata Chevreux, 1912, which was provisionally assigned to the newly proposed genus and afterwards redescribed and confirmed as belonging to Fuegiph-oxus (Chiesa and Alonso, 2011). Both the genera Parharpinia and Pontharpinia, plus Protophoxus K.H. Barnard, 1930, Trichophoxus K.H. Barnard, 1930 and Metharpinia Schellenberg, 1931, were considered a synonym of Protophoxus by J.L. Barnard (1960). Barnard and Drummond (1976) examined individuals of the type species belonging to the genera previously mentioned (except Metharpinia) and reconsidered their validity based on the analysis of 250 known characters and some new ones.

Considering the story of reallocations over the years between these phoxocephalid genera cited above, it is clear to see that Parharpinia and Pontharpinia were treated as close taxa, even being synonymized within Paraphoxus. Moreover, one species from each genus was removed from its current assigned genera to Fuegiphoxus, which was raised on the basis of the following divergences from Paraphoxus: antenna 2, article 4 with weak division of the stout setae rows and proximal position of the dorsal notch; mandibular molar with elongation of the third stout seta; maxilla 1, inner plate with 4 setae; maxillilped, inner plate with 1 apical Stout seta; gnathopod 1, carpus elongate; gnathopod 2 significantly enlarged; gnathopod 2, carpus cryptic; pereopod 3-4, merus and carpus with well-developed facial setae; pereopod 7, apical digitation of propodus; and uropod 1-2, rami with lowered flexibility of the apical nail. To allocate F. uncinatus, Chiesa and Alonso (2011) made an emended diagnosis of the genus by adding the following character states: maxillilped, inner plate with 1 or 2 apical Stout setae; gnathopod 2, carpus subcryptic to cryptic; epimeral plate 3, posteriorventral corner rounded or with hook; telson bearing two or three apical Stout setae.

Although one assumes the new genus has a relationship with Fuegiphoxus and Parharpinia, herein, we decided to establish a new genus instead of making an emended diagnosis of the morphologically closest taxon, especially because of many noteworthy combinations and exclusive characters that will be discussed below.

MATERIALS AND METHODS

The material examined was collected between 1970 and 1971 by R/V Prof. W. Besnard at 224 and 500 m depth off Brazil’s southeastern coast in the states of Rio de Janeiro and São Paulo. The campaign was organized by the Instituto Oceanográfico of the Universidade de São Paulo (IO - USP), within the Mini Biological Trawl (MBT) project. All specimens were preserved in 70% ethanol and deposited in the Crustacea Collection of the Universidade do Estado do Rio de Janeiro (UERJ). For the taxonomic study, the appendages were dissected and mounted in glycerin gel slides, drawn under an optical microscope with a Motic BA-310 camera lucida and digitized with CorelDRAW 2018. The setal/spine classification adopted in this paper follows Garm and Watling (2013). The nomenclature of the gnathopod palm is based on Poore and Lowry (1997).
RESULTS

Order AMPHIPODA Latreille, 1816
Suborder Amphilocheidea Boeck, 1871
Superfamily Haustorioridea Stebbing, 1906
Family Phoxocephalidae Sars, 1891

Diagnosis (after Barnard and Karaman, 1991). Rostrum visor-like or absent, not cylindrical; ventral cephalic cheek weak or absent. Article 3 of antenna 1 short; article 4 of antenna 2 with facial stout setae. When rostrum reduced or absent, facial stout setae occurring on article 4 of antenna 2 or articles 4-5 of pereopods 5-6. Right incisor broad and 3+ toothed; mandibular palp article 3 with up to 2 sets of outer setae apically and 3+ toothed; mandibular palp article 3 with up to 2 sets of outer setae apically; facial margin with one row of setae extending to dorsal apex. Mandible molar, if triturative, of cup-shaped form, otherwise “spinose” or simple. Inner plate of maxilla 1 never triturative, but as a small hump with 3 multicuspidate stout setae, incisor toothed, palpar hump small. Mandible molar not triturative, but as a small hump with 3 multicuspidate stout setae, incisor toothed, palpar hump small. Maxilla 1 palp 2-articulate. Maxilla 2 inner plate sub- setose; propodus with stout setae defining palm. Pereopod 5, basis broad, expanded. Pereopod 5 basis broad, expanded.

Subfamily Phoxocephalinae Sars, 1891

Diagnosis. Pereopod 5, basis broad, expanded.

Composition of the subfamily. The subfamily is composed of 270 species grouped in 70 genera (Horton et al. 2019) + 1 new genus: Atlantiphoxus n. gen. (1 species); Baliphoxus Ortiz and Lalana, 1999 (1 species); Bathyvirbiurus Senna, 2010 (1 species); Beverlyaphoxus Jarrett and Bousfield, 1994 (1 species); Birubius Barnard and Drummund, 1976 (48 species); Booranus Barnard and Drummund, 1978 (4 species); Broglus Barnard and Drummund, 1978 (7 species); Cephalophoxoides Gurjanova, 1977 (10 species); Cephalophoxus Gurjanova, 1977 (1 species); Cunmunra Barnard and Drummund, 1978 (1 species); Diogodius Barnard and Drummund, 1978 (2 species); Elpeddo Barnard and Drummund, 1978 (1 species); Eobrolgus Barnard, 1979 (3 species); Eusyrtaphoxus Gurjanova, 1977 (1 species); Eyakkia Barnard, 1979 (5 species); Foxiphillus Barnard, 1979 (12 species); Fuegiphoxus Barnard and Barnard, 1980 (4 species); Gainha Barnard and Drummund, 1978 (1 species); Grandifoxus Barnard, 1979 (15 species); Griffithsius Jarrett and Bousfield, 1994 (1 species); Hopiphoxus Barnard and Drummund, 1978 (1 species); Indophoxus Dang and Le, 2005 (1 species); Japaraphoxus Barnard and Drummund, 1978 (1 species); Jeraldaria Barnard and Drummund, 1978 (1 species); Joubinella Chevreux, 1908 (6 species); Kondoleusis Barnard and Drummund, 1978 (1 species); Kotita Barnard and Drummund, 1978 (1 species); Kulafaphoxus Barnard and Drummund, 1978 (3 species); Kuritus Barnard and Drummund, 1978 (1 species); Leongathus Barnard and Drummund, 1978 (2 species); Leptophoxoides Barnard, 1962 (2 species); Leptophoxus G. O. Sars, 1891 (1 species); Limnoporeia Fearn-Wannan, 1968 (10 species); Linca Alonso de Pina, 1993 (1 species); Majoiaphoxus Jarrett and Bousfield, 1994 (1 species); Mandibulaphoxus Barnard, 1957 (8 species); Matong Barnard and Drummund, 1978 (1 species); Mesophoxus Gurjanova, 1977 (1 species); Metaphoxoides Ledoyer, 1968 (3 species); Metaphoxus Bonnier, 1896 (8 species); Metharpinia Schellenberg, 1931 (10 species); Microphoxus Barnard, 1960 (5 species); Palabriaphoxus Gurjanova, 1977 (2 species); Parafoxiaphoxus Alonso de Pina, 2001 (1 species); Parafoxiaphoxus Gurjanova, 1977 (1 species); Parametaphoxus Gurjanova, 1977 (3 species); Parafoxiaphoxus G. O. Sars, 1891 (14 species); Paraphoxus Stebbing, 1899 (4 species); Phoxocephalus Stebbing, 1888 (2 species); Phoxorgia Barnard and Barnard, 1980 (1 species); Pontharpinia Stebbing, 1897 (5 species); Protophoxus K.H. Barnard, 1930 (1 species); Pseudofoxiphalus Andres, 1991 (1 species); Rhepoxynius Barnard, 1979 (18 species); Rikkarus Barnard and Drummund, 1978 (1 species); Ringaringa Barnard and Karaman, 1991 (1 species); Synphoxus Gurjanova, 1980 (1 species); Tickalerus Barnard and Drummund, 1978 (1 species); Tipimegus Barnard and Drummund, 1978 (5 species); Trichaphoxus K.H. Barnard, 1930 (2 species); Uldanamia Barnard and Drummund, 1978 (1 species); Urophoxus Gurjanova, 1977 (=Pontharpinia according to Barnard and Karaman, 1991); Vasco Barnard and Drummund, 1978 (1 species); Vietophoxus Dang and Le, 2005 (1 species); Waipirophoxus Gurjanova, 1980 (1 species); Waingterfinch, 1977 (3 species); Wildus Barnard and Drummund, 1978 (5 species); Yammacoona Barnard and Drummund, 1978 (1 species); Yen Barnard and Drummund, 1978 (2 species).
Table 1. – Diagnostic characters of Atlantiphoxus n. gen. and its closest genera.

<table>
<thead>
<tr>
<th></th>
<th>Atlantiphoxus n. gen.</th>
<th>Fuegiphoxus</th>
<th>Linca</th>
<th>Parharpinia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td>Absent</td>
<td>Present (dubious in F. abjectus)</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Antenna 2 article 4 stout facial setae</td>
<td>In one main row</td>
<td>Up to two rows</td>
<td>In three rows</td>
<td>In one main row (rarely in 2+ rows)</td>
</tr>
<tr>
<td>Maxilliped inner plate</td>
<td>With one stout seta apically</td>
<td>With 1–2 stout setae apically</td>
<td>With one stout seta apically</td>
<td>With 2–6 stout or thin setae apically</td>
</tr>
<tr>
<td>Pereopods 3–4 dactylus</td>
<td>Stout</td>
<td>Slender</td>
<td>Slender</td>
<td>Slender</td>
</tr>
<tr>
<td>Pereopod 5 basis</td>
<td>Strongly tapering distally</td>
<td>Weakly tapering distally</td>
<td>Not tapering</td>
<td>Weakly tapering distally</td>
</tr>
<tr>
<td>Pereopod 7 basis anterodistal lobe</td>
<td>Produced, bearing a row of long plumose setae</td>
<td>Not produced, without row of setae</td>
<td>Not produced, bearing a row of long setae</td>
<td>Not produced, without row of setae</td>
</tr>
<tr>
<td>Epimeral plate 3</td>
<td>Without setae</td>
<td>Bearing two or more setae</td>
<td>Bearing four or more setae</td>
<td>Bearing three or more setae</td>
</tr>
<tr>
<td>Uropod 2 peduncle dorsomedial margin</td>
<td>With a row of long stout pectinate setae</td>
<td>With a row of short to medium stout setae</td>
<td>With a row of short to medium stout setae</td>
<td>With a row of short setae</td>
</tr>
<tr>
<td>Telson apex</td>
<td>With three long setae</td>
<td>With two or three short to medium stout setae</td>
<td>With one short and one medium stout seta</td>
<td>With up to three short to medium stout setae</td>
</tr>
</tbody>
</table>

**Type species.** Atlantiphoxus wajapi n. sp. (by monotypy)

**Etymology.** The genus name *Atlantiphoxus* is a combination of the word “Atlantic” in reference to its geographical distribution, so far exclusive to the Atlantic Ocean, plus *phoxus* attributed to the family name Phoxocephalidae.

**Remarks.** Atlantiphoxus n. gen. shares the following characters with *Fuegiphoxus*: antennae 1–2 flagella not reduced; right mandible molar as a hump with 3 stout multicuspitate setae, incisor with 3 teeth, palp harp small; maxilla 1 palp 2-articulate; gnathopods 1-2 weakly setose anteriorly, without eusirid attachment, propodus ovovate-rectangular, palm acute; uropods 1-2 rami with apical nail immersed; telson with subtruncate apex and a weak lateral acclivity. However, the new genus differs from *Fuegiphoxus* by the following characteristics (characters of *Fuegiphoxus* in parentheses): eyes absent (present, but dubious in *F. abjectus*); antenna 2 article 4 stout facial setae in 1 row (up to 2 rows); pereopods 3–4 dactylus stout (slender); pereopod 7 basis with anterodistal lobe produced and bearing a row of long plumose setae (not produced, without setal row), dactylus elongate (ordinary); epimeral plate 3 strongly produced posteriorly (not produced); uropod 1 outer ramus with 3 stout setae dorsally (1-2 setae); uropod 2 peduncle with a row of long pectinate setae (with stout and not pectinate setae); telson with 3 long setae apically on each lobe (1-2 setae).

The new genus shares the follow characters with *Parharpinia* as well: antenna 1 article 2 ventral setae widely spread; mandibles, palp harp small, apex of palp oblique; maxilla 1 inner plate with 4 setae; gnathopods similar, weakly setose anteriorly, without eusirid attachment, palm acute; pereopods 3-4 carpus with postproximal setae; pereopods 5-6 merus and carpus narrow; uropods 1-2 rami not continuously with stout setae to apex; uropod 3 showing one ramus longer than peduncle. However, the Brazilian genus differs from *Parharpinia* by the following characters (characters of *Parharpinia* in parentheses): antenna 2 article 4 facial setal row not stout (stout setae); mandibles molar with 3 stout setae (with 4+), incisor with 4 teeth (with 3 teeth); pereopods 3-4 propodus with thin armaments (with thick armaments); pereopod 5 basis strongly tapering distally (weakly tapering); epimeral plates 1-2 with facial plumose setae and naked posteriorly (with posterior setae); epimeral plate 3 naked (with 3+ long setae); uropod 1 without apicomical major displaced stout seta (with); telson with 3 long setae apically on each lobe (without long setae).

**Atlantiphoxus** n. gen. also resembles to *Linca* Alonso de Pina, 1993, a monotypic genus described for Argentinean waters, by the following characters: eyes absent, or at least not apparent on *Linca* as stated by Alonso de Pina (1993); mandibles molar as a small hump with 3 stout setae, 1 being long and 2 shorter; maxilla 1 palp 2-articulate, inner plate with 4 setae; maxilliped dactyl elongate, nail medium; gnathopods small but dissimilar, carpus free, not cryptic, propodus ovate and weakly setose anteriorly; pereopod 6 basis with produced lobe postero-distally; pereopod 7 basis expanded, reaching the apex of merus, naked ventrally; epimeral plates 2-3, ventral margin with plumose setae, posterior margin naked; uropod 2 peduncle laterally combed distally. However, *Atlantiphoxus* n. gen. can be distinguished from *Linca* by the following characters (characters of *Linca* in parentheses): antenna 1 article 2 medium (elongate); antenna 2 article 4 facial setal row in 1 row (in 3 rows); pereopod 5 strongly tapering distally (not tapering); epimeral plate 1 posteroventral corner weakly produced into a small spine (rounded, not produced); epimeral plate 3 strongly produced and naked (not produced, with ventral and posterior setae); uropod 1 with 4 basofacial setae proximally (with 7 basofacial setae); telson with 3 long setae apically on each lobe (with 1 short and 1 medium stout setae).

The differences between *Atlantiphoxus* n. gen. and the closest genera are summarized in Table 1, showing the most important diagnostic characters. Although the new genus can be diagnosed by a new combination of characters, within a hypothetic clade formed by *Fuegiphoxus* and *Parharpinia*, the new taxon can be differentiated by the following exclusive features: deep
pereonites with small coxae; antenna 2, article 4, stout facial setae in 1 row extending to dorsal apex; maxilliped, inner plate with 3 blunt projections apically; pereopods 3-4 with stout dactylus; pereopod 5, basis strongly tapering; pereopod 6, basis with produced posterodistal lobe; pereopod 7, basis with anterodistal lobe produced bearing a row of long plumose setae; epimeral plate 3, posteroventral corner naked, rounded and strongly produced; telson, apex truncated, with 3 long setae on each lobe apically.

**Atlantiphoxus wajapi** n. sp. (Figs 1-5)

**Material examined:** Holotype: female, 2.6 mm, dissected and drawn, MBT 144, 23°53′S 42°28′W, 500 m depth, Rio de Janeiro state, 03 September 1970, UERJ 401. Paratypes: 1 female, dissected and drawn, MBT 180, 25°55′S 45°46′W, 224 m depth, São Paulo state, 29 May 1971, UERJ 402; 1 female, in 70% ethanol, MBT 180, 25°55′S 45°46′W, 224 m depth, São Paulo state, 29 May 1971, UERJ 403.

**Diagnosis.** Same as the genus.

**Etymology.** Named after the Wajãpi, as a tribute to the indigenous people living in the north of South America, who have been constantly and violently threatened but are resisting in an area explored by illegal miners and mining companies.

**Description.** Based on holotype. Habitus as in Figure 1. Head (Fig. 2A-B) with rostrum entire and unconstricted; eyes absent. Antenna 1 (Fig. 2C) peduncle article 1 about 1.9× longer than wide, ventral margin with 3 long plumose and 4 brush setae distally, dorsal margin with setules and 2 setae; article 2 medium, about 50% the length of article 1, ventral margin with 6 setae, facial margin with 2 setae distally; article 3 about 40% the length of article 2, ventral margin with 3 setae; primary flagellum 8-articulate; accessory flagellum 6-articulate. Antenna 2 (Fig. 2D) peduncle article 3, facial margin with 1 long seta, dorsal margin with 1 seta distally; article 4, ventral margin with 7 long stout pectinate setae, facial margin with 1 brush setae and one row of setae extending to dorsal apex, dorsal margin with 3 setae proximally; article 5, ventral margin with 8 long stout setae, dorsal margin with 2 stout setae medially; flagellum 8-articulate. Upper lip (Fig. 2G) naked, produced apically as a sub-rounded lobe. Left mandible (Fig. 2I) molar as a small hump with 3 multicuspidate stout setae, incisor with 4 teeth, lacinia mobilis elongate, with 3 teeth, 1 being minute in the middle, accessory setal row with 10 multicuspidate stout setae, palpal hump small; palp 3-articulate, article 1 short; article 2, with 3 setae; article 3 slightly longer than article 2, apex oblique, with 8 medium to long setae; Right mandible (Fig. 2J) molar as a small hump with 3 multicuspidate stout setae, incisor with 3 teeth, lacinia mobilis with 4 teeth, 1 being longer and multicuspidate, accessory setal row with 7 multicuspidate stout setae, palpal hump small; palp 3-articulate, article 1 short; article 2, with 4 setae; article 3, slightly longer than article 2, apex oblique, with 7 medium to long setae. Maxilla 1 (Fig. 2E) inner plate medial margin with 1 simple and 1 plumose seta, apical margin with setules and 2 setae; outer plate, with 11 multicuspidate stout setae; palpal 2-articulate, with 9 setae apically and subapically, medial and lateral margins with setules. Maxilla 2 (Fig. 2F) inner plate slightly shorter than outer, medial margin covered with setules, subapical margin with 3 stout plumose setae, apical margin with 6 plumose setae; outer plate, lateral margin covered with setules, apical margin with simple and plumose setae. Maxilliped (Fig. 2H) inner plate medial margin with 3 setae, apical margin with 3 blunt projections and 1 stout and 3 long setae; outer plate medial margin with 5 stout and 2 long setae, apical margin with 2 long plumose and 2 stout setae, lateral margin covered with...
setules; palp article 2 weakly setose medially, article 3 with few setae on its margins, article 4 slender and elongate, with 1 medium apical nail.

Gnathopod 1 (Fig. 3A) weakly setose; coxa sub-rectangular, ventral margin with 10 long setae; basis about 3.4× longer than wide, anterior margin with 1 long and 1 medium setae distally, posterior margin with setae medially, posteroventral corner with 5 setae; ischium short and sub-rectangular, posteroventral corner with 3 setae; merus posterior margin with 5 setae, facial margin with 3 setae; carpus anterior margin with 2 setae, posterior margin with 12 setae, facial margin with 1 seta; propodus anterior margin with 3 setae distally, posterior margin with 1 seta medially, with 1 stout seta defining palm; palm acute, weakly sinuous, with few setae on its margin; dactylus slightly longer than palm, outer margin with 1 setule proximally and 1 spatulate seta distally. Gnathopod 2 (Fig. 3B) weakly setose; coxa sub-rectangular, ventral margin with 9 long setae; basis about 3.2× longer than

Fig. 2. – *Atlantiphoxus wajapi* n. sp. holotype female (UERJ 401). A, head in lateral view; B, head in dorsal view; C, antenna 1; D, antenna 2; E, maxilla 1; F, maxilla 2; G, upper lip; H, maxilliped; I, left mandible; J, right mandible. Scale bars: A-D and I-J: 0.2 mm, E-H: 0.1 mm.
wide, anterior margin with few setae, posterior margin with 5 long pectinate setae medially, posterodistal corner with a tuft of long pectinate setae; ischium small and subrectangular, posterodistal corner with 6 setae; merus posterior margin with 6 setae, facial margin with 1 seta; carpus anterior margin with 1 seta distally, posterior margin with 7 setae; propodus anterior margin with 4 setae distally, posterior margin with 1 seta medially, with 1 stout seta defining palm; palm acute, weakly sinuous, with few setae on its margin; dactylus subequal to palm, outer margin with 1 setule proximally and 1 spatulate seta distally. Pereopod 3 (Fig. 3C) coxa sub-rectangular, posterior margin weakly concave, ventral margin with 9 pectinate setae; basis about 2.8× longer than wide, posterior margin with 4 setae medially, posterodistal corner with 3 setae; ischium small and sub-rectangular, posterodistal corner with 4 setae; merus anterior margin with 5 setae distally, posterior margin moderately setose, facial margin with a row of 6 setae distally; carpus

Fig. 3. – *Atlantiphoxus wajapi* n. sp. holotype female (UERJ 401). A, gnathopod 1; B, gnathopod 2; C, pereopod 3; D, pereopod 4. Scale bars: A-B: 0.2 mm, C-D: 0.5 mm.
posterior margin moderately setose, with 1 thicker stout seta distally, almost reaching half of dactylus; propodus anterior margin with 1 short seta distally, posterior margin with 4 setae; dactylus stout, about 75% the length of propodus. Pereopod 4 (Fig. 3D) coxa weakly expanded anteriorly, posterodorsal margin excavate, ventral margin with 17 pectinate setae; basis about 2.9× longer than wide, posterior margin and posterodistal corner with 4 setae each; ischium small and sub-rectangular, posterodistal corner with 3 setae; merus anterior margin with 5 setae distally, posterior margin moderately setose; carpus posterior margin moderately setose, with 1 thicker stout seta distally, almost reaching half of dactylus; propodus anterior margin with 1 short seta distally, posterior margin with 4 long setae; dactylus elongate, about 70% the length of propodus. Pereopod 6 (Fig. 4B) coxa sub-rounded, posteroventral margin weakly expanded, with 2 setae; basis about 1.2× longer than wide, anterior margin with long plumose and stout setae medially, anterodistal corner with a row of 8 long plumose setae; ischium small and subquadrate, anterior margin with 4 plumose setae; merus anterior margin with 4 stout and 8 long setae; carpus facial setal formula: 3-5-3-6, posterior margin with 1 stout and 5 long setae; propodus anterior margin with 1 long and 2 stout setae, 1 seta medially; ischium small and sub-rectangular, facial margin with row of 5 setae extending to anterodistal corner; merus anterior margin moderately setose, with a row of 5 setae distally, posterior margin with 5 papposerrate and 5 stout setae; carpus facial setal formula: 3-5-4-3, anterior margin with 8 long setae, posterior margin with papposerrate and simple setae; propodus anterior and posterior margins weakly setose, distal apex with 9 setae; dactylus elongate, about 70% the length of propodus. Pereopod 6 (Fig. 4B) coxa sub-rounded, posteroventral margin weakly expanded, with 2 setae; basis about 1.2× longer than wide, anterior margin with long plumose and stout setae medially, anterodistal corner with a row of 8 long plumose setae; ischium small and subquadrate, anterior margin with 4 plumose setae; merus anterior margin with 4 stout and 8 long setae; carpus facial setal formula: 3-5-3-6, posterior margin with 1 stout and 5 long setae; propodus anterior margin with 1 long and 2 stout setae, 1 seta medially; ischium small and sub-rectangular, facial margin with row of 5 setae extending to anterodistal corner; merus anterior margin moderately setose, with a row of 5 setae distally, posterior margin with 5 papposerrate and 5 stout setae; carpus facial setal formula: 3-5-4-3, anterior margin with 8 long setae, posterior margin with papposerrate and simple setae; propodus anterior and posterior margins weakly setose, distal apex with 9 setae; dactylus elongate, about 70% the length of propodus. Pereopod 6 (Fig. 4B) coxa sub-rounded, posteroventral margin weakly expanded, with 2 setae; basis about 1.2× longer than wide, anterior margin with long plumose and stout setae medially, anterodistal corner with a row of 8 long plumose setae; ischium small and subquadrate, anterior margin with 4 plumose setae; merus anterior margin with 4 stout and 8 long setae; carpus facial setal formula: 3-5-3-6, posterior margin with 1 stout and 5 long setae; propodus anterior margin with 1 long and 2 stout setae,
posterior margin with 1 stout and 3 long setae, distal apex with 1 stout and 6 setae; dactylus elongate, about 70% the length of propodus. Pereopod 7 (Fig. 4C) coxa sub-rounded, posteroventral margin with 1 short seta; basis slightly wider than long, expanded posteroventrally, almost reaching the apex of merus, anterior margin with 5 setae proximally, anterodistal lobe produced with a row of 16 long plumose setae, posterior margin with 6 serrations, with setules and 1 long seta, ventral margin smooth; ischium small and sub-rectangular, distal lobe produced, anterior margin with 5 plumose setae, posterior margin with setules; merus anterior margin with 6 setae, posterior margin with 1 seta distally; carpus anterior and posterior margins weakly setose; propodus anterior margin with 6 setae, posterior margin with 7 setae; dactylus elongate, about 80% the length of propodus, outer margin with 1 short plumose seta proximally.

Epimeral plate 1 (Fig. 5A) anterior and ventral margins almost straight, with facial row of long plumose setae, anteroventral corner rounded, posteroventral corner weakly produced into a small spine, posterior margin convex. Epimeral plate 2 (Fig. 5B) anterior and ventral margins almost straight, with facial row of 5 long plumose setae, anteroventral and posteroventral corners rounded, posterior margin convex. Epimeral plate 3 (Fig. 5C) anterior margin weakly concave, anteroventral corner rounded, ventral margin weakly concave proximally, posteroventral corner rounded and strongly produced. Uropod 1 (Fig. 5D) peduncle 2.9× longer than wide, with 4 basofacial setae proximally, dorsolateral corner with 1 stout setae, dorsomedial margin with 5 setae; outer ramus dorsal margin with 3 stout setae, bearing 1 apical nail; inner ramus subequal to outer, dorsal margin with 1 stout seta, bearing apical nail. Uropod 2 (Fig. 5E) peduncle 2× longer than wide, dorsolateral corner weakly projected and laterally combed distally, dorsomedial margin with 8 long stout pectinate setae; outer ramus dorsal margin with 3 stout setae, bearing 1 apical nail; inner ramus...
subequal to outer, naked, bearing 1 apical nail. Uropod 3 (Fig. 5F) peduncle 1.5× longer than wide, ventral margin with 5 long setae distally, dorsal margin with 1 short seta; outer ramus about 1.9× longer than inner, article 1 ventral margin with 4 setae medially and 3 distally, dorsal margin with 1 long seta distally, article 2 elongate, with 2 long pectinate setae apically; inner ramus with 2 setae apically. Telson (Fig. 5G) about 85% cleft, apex truncate, with 3 long setae and 1 short seta on each lobe, dorsal margin with 2 short plumose setae medially.

**Type locality.** Rio de Janeiro state coast (23°53’S 42°28’W).

**Ecological data.** *Atlantiphoxus wajapi* n. gen., n. sp. was collected with a rectangular dredge on a sediment bottom covered with *Globigerina* ooze and dark grey mud (station MBT 144). There is no sediment information for station MBT 180.

**Geographic distribution:** The species is known for the coast of the Brazilian states of Rio de Janeiro (23°53’S 42°28’W) and São Paulo (25°55’S 45°46’W) (Fig. 6).

**DISCUSSION**

*Atlantiphoxus wajapi* n. sp. has the following new combination of noteworthy characters: Body with deep pereonites and small coxae. Head with rostrum unconstricted; eyes absent; maxilliped, inner plate apical margin with 3 blunt projections and 1 stout seta apically; palp apical nail medium. Gnathopods 1–2 propodus with 1 stout seta defining palm; palm weakly sinuous; dactylus outer margin with 1 spatulate seta distally. Pereopods 3–4 carpus ventral margin with main stout distal setae exceeding the apex of propodus. Pereopod 5 basis proximally broad and strongly tapering distally. Pereopod 6 posterodistal lobe produced, anterodistal margin with a row of long plumose setae extending to facial margin. Pereopod 7 basis expanded posteroventrally, almost reaching the apex of merus, posterior margin serrate, anterodistal lobe produced and with a row of long plumose setae; dactylus elongate. Epimeral plates 1–2 facial margin with long plumose setae. Epimeral plate 3 naked, posteroventral margin strongly produced and rounded. Uropods 1–2 rami not continuously with stout setae to apex, bearing apical nail. Uropod 2 peduncle dorsal margin with...
a row of long pectinate setae. Telson apex truncated, with 1 short plumose and 3 long setae on each lobe, dorsal margin with 2 plumose setae.

Considering the statements by Barnard and Drummond (1978), the ancestor of the phoxocephalids would have an enlarged second gnathopod. Thus, the new genus can be hypothesized as more advanced and derived from Fuegiphoxus based on the reduction in size of gnathopod 2 and the elongation of its propodus. It was assumed by the same authors that the phoxocephalids used the Magellanic region, which has 17 phoxocephalid species grouped into 11 genera (Alonso de Pina et al. 2008), as a main stopover during the migratory processes from Australia. The Australian waters are considered a main centre of origin for Phoxocephalidae, since it retains Pontnerpinia, treated as the most primitive genus within the family (Barnard and Karaman 1983). These centres are taken as hotspots where successful taxa are able to leave and spread around prosperous regions (Briggs 2003). Barnard and Drummond (1978) proposed a theory for the migration process of the subfamily Harpininae, and this hypothesis can be extended to the Phoxocephalinae as well, assuming that the new genus is an outcome of the migratory phoxocephalid pathway towards northern waters through the deep sea, since Fuegiphoxus is currently recorded for the western Antarctic, sub-Antarctic and Magellan region at depths of 0 to 1031 m (Alonso de Pina et al. 2008, Chiesa and Alonso 2011). This explanation agrees with the statement by Myers and Lowry (2009) regarding the Trans-Pacific tracks of other benthic amphipods of the superfamily Haustorioidae, such as Phoxocephalopsidae Barnard and Drummond, 1982, Urohaustoriidae Barnard and Drummond, 1982 and Zobrachioidea Barnard and Drummond, 1982.

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