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1981 (Crustacea: Isopoda: Oniscidea:
Philosciidae) with new records and new
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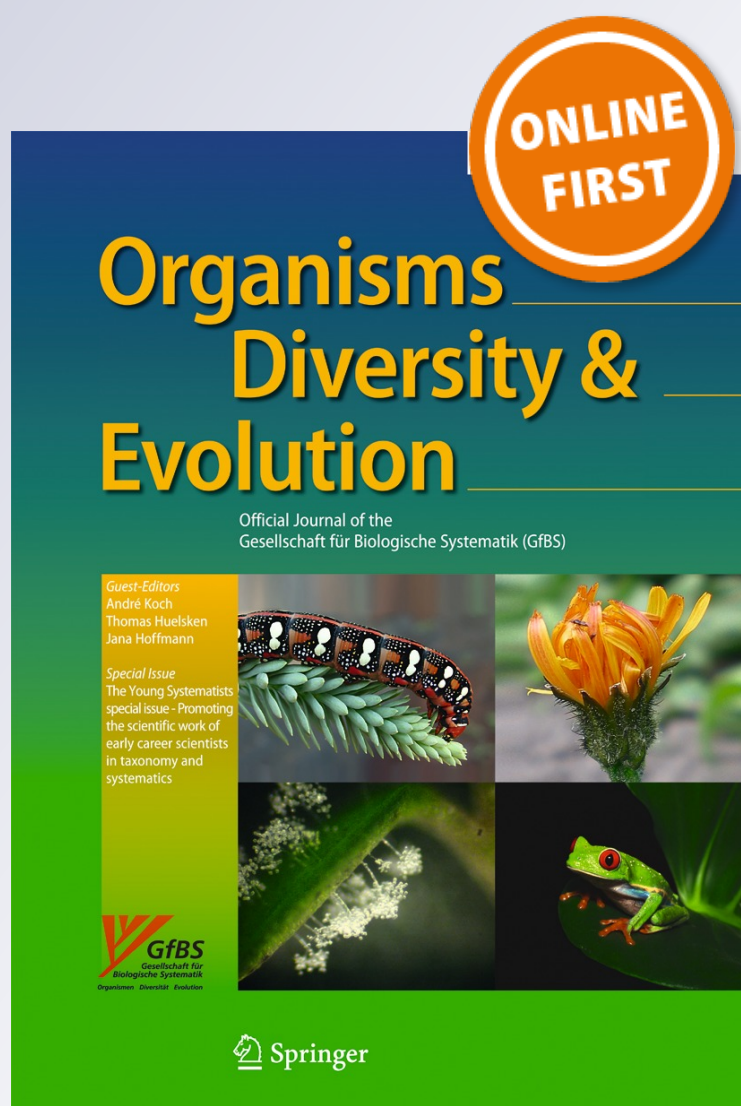
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Review of *Atlantoscia* Ferrara & Taiti, 1981 (Crustacea: Isopoda: Oniscidea: Philosciidae) with new records and new species

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Abstract The neotropical genus *Atlantoscia* Ferrara & Taiti, 1981 includes three species, *A. floridana* Van Name, 1940, occurring in coastal regions of Florida (USA), Brazil, Argentina, and Ascension and Saint Helena islands, *A. rubromarginata* Araujo & Leistikow, 1999 and *A. petronioi* Campos-Filho, Contreira and Lopes-Leitzke, 2012 from Brazil. Two new species from Brazil are here described, one from the state of Bahia and one from the state of São Paulo. All the new species have respiratory areas on pleopods 1–5 exopods. The specimens were collected in areas of Atlantic Forest and in cocoa (*Theobroma cacao*) plantations. New records of *A. floridana* and *A. rubromarginata* and distribution maps are presented.

Keywords New species · Terrestrial isopods · Brazil · Neotropics

Introduction

The family Philosciidae Kinahan (1857) includes approximately 660 species placed among 114 genera (Schmalfuss 2003) widely distributed in Australia, southern Asia, Africa, Europe and the Americas. It is one of the most important groups of terrestrial isopods in tropical and wetlands habitats (Leistikow 2001). The family has been considered to be

a paraphyletic assemblage owing to characters shared with Scleropactidae Verhoeff (1938) and Halophilosciidae Verhoeff (1908) (Leistikow 2001; Schmidt 2002, 2008).

The genus *Atlantoscia* Ferrara & Taiti, 1981 was erected to allocate the new species *A. alceui* from Ascension Island. This species was later considered to be a junior synonym of *A. floridana* (Van Name 1940), originally described from Winter Park, Florida, USA, and widely distributed in coastal regions of Florida (USA), Brazil, Argentina, and Ascension and St. Helena Islands (Schmalfuss 2003; Taiti and Ferrara 1991). Two more species of *Atlantoscia* are presently known: *A. rubromarginata* Araujo & Leistikow, 1999 from the state of Sergipe, Brazil (Araujo and Leistikow 1999) and *A. petronioi* Campos-Filho, Contreira & Lopes-Leitzke, 2012 from the state of Rio Grande do Sul, Brazil (Campos-Filho et al. 2012).

In the present contribution the taxonomy of all the species of *Atlantoscia* is revisited and two new species are described.

Systematic review

Moreira (1927) described *Philoscia paulensis* from São Paulo, Brazil, based on specimens donated by J. Schenck, but its description and illustrations are insufficient to recognize the species. Subsequently, Moreira (1931) published a French version of his previous work (Moreira 1927) adding some species and some remarks not mentioned in the original work. Van Name (1940) described *Philoscia floridana* from Florida, discussing its relationships with *Philoscia inquilina* [= *Formicascia inquilina* (Van Name 1936)]. Schultz (1964) described *Philoscia bonita* from Florida, probably the same species cited in previous articles as *Philoscia* sp. (Schultz 1961, 1963). Vandel (1963) examined Delamare Debutteville's collection of terrestrial isopods

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from Rio de Janeiro and São Paulo, Brazil, and the province of La Plata, Argentina, and re-described and transferred *P. paulensis* to *Chaetophiloscia* Verhoeff (1908) based on Moreira's (1927), Schenck's (1927) and Van Name's (1940) illustrations. Lemos de Castro (1958) commented about the dubious position of *P. paulensis* and later he synonymized *P. paulensis* to *Balloniscus sellowii* (Brandt 1833) and assumed that *C. paulensis* cited by Vandel (1963) from southern Brazil and northern Argentina is not related to *B. sellowii* (Lemos de Castro, 1976). Ferrara and Taiti (1981) proposed a new genus (*Atlantoscia*) and a new species (*A. alceui*) from Ascension Island for *Chaetophiloscia paulensis* sensu Vandel (1963). Schultz and Johnson (1984) examined material from Florida and material recorded by van Name (1940) and transferred *P. floridana* to the new genus *Ocelloscia*. Lemos de Castro (1985) re-described *A. alceui* after examining material from the Brazilian states of Pará, Pernambuco, Paraíba, Rio Grande do Norte, Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo, Paraná and Rio Grande do Sul. Taiti and Ferrara (1991) synonymized *Atlantoscia alceui* with *Ocelloscia floridana* in the new combination *A. floridana*. Araujo and Leistikow (1999) studied the relationships of pleopodal lungs in *Atlantoscia*, *Balloniscus* Budde-Lund (1908) and *Benthana* Budde-Lund (1908), re-described *A. floridana*, and described the new species *Atlantoscia rubromarginata*. Leistikow (2001) provided a phylogenetic tree for the South American Philosciidae where *Atlantoscia* is included in a clade with *Benthana* and Rhyscotidae. Recently, Campos-Filho et al. (2012) described *A. petronioi* from Restinga area of the state of Rio Grande do Sul, Brazil.

Other studies where *Atlantoscia* species are mentioned, but without a systematic context, include Duffey (1964), Lenko (1971), Johnson (1986), Araujo et al. (1996), Ashmole and Ashmole (1997), Souza-Kury (1998), Leistikow and Wägele (1999), Leistikow and Araujo (2001) Schmalfuss (2003), Amato et al. (2003), Araujo et al. (2004a, b), Araujo and Bond-Buckup (2004, 2005), Lopes et al. (2005), Almerão et al. (2006), Quadros and Araujo (2007, 2008), Quadros et al. (2009), Quadros (2010), and Magrini et al. (2010, 2011).

Materials and methods

The appendages and coxal plates were mounted on slides. Drawings were prepared using a drawing tube. For the scanning electron microscopy analysis, the dissected appendages were prepared according to the technique from Leistikow and Araujo (2001). Measurements of the *noduli laterales* were obtained as in Vandel (1962). Setae and spines were classified as in Leistikow (2001). Distribution maps were produced with Quantum-GIS (v. 1.7.1) (OSGeo 2011).

Types have been deposited in the collections of the Museu de Zoologia (MZUSP), Universidade de São Paulo,

São Paulo, and Coleção de Crustáceos do Departamento de Zoologia (UFRGS), Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil.

Taxonomic section

Family Philosciidae Kinahan (1857).

Genus *Atlantoscia* Ferrara & Taiti, 1981.

Type species: *Atlantoscia alceui* Ferrara & Taiti, 1981.

Diagnosis

See Ferrara and Taiti (1981) and Araujo and Leistikow (1999).

Atlantoscia floridana (Van Name 1940) (Fig. 12a)

Philoscia floridana Van Name 1940:113, Fig. 4.

Philoscia sp.; Schultz 1961:170; Schultz 1963:439; Duffey 1964:249.

Chaetophiloscia paulensis; Vandel 1963:74, Figs 7 and 8; Vandel 1968:68; Vandel 1977:388; Lemos de Castro 1971:11.

Philoscia bonita; Schultz 1964:156, Figs 1–27.

Atlantoscia alceui; Ferrara and Taiti 1981:190, Figs 1–4; Lemos de Castro 1985:418, Figs 1–16.

Ocelloscia floridana; Schultz and Johnson 1984:161, Figs 4, 5 and 11; Johnson 1986:123, Figs 2 and 3.

Atlantoscia floridana: Taiti and Ferrara 1991:902, Figs 1–15; Araujo et al. 1996:115, Figs 11–14 and 64; Souza-Kury 1998:658; Leistikow and Wägele 1999:13; Araujo and Leistikow 1999:117, Figs 6–10; Leistikow 2001:6; Leistikow and Araujo 2001:330, Fig. 1, and plate 1 a and b; Schmalfuss 2003:49.

nec Philoscia paulensis; Moreira, 1927:194, Figs 1–3; Moreira 1931:426, Fig. 1; Lemos de Castro 1958:7; Lemos de Castro 1976:391.

Material examined

United States: Florida: 4 ♂♂, 13 ♀♀, Everglades, Miccosukee Indian Reservation (25°45'49"N, 80°45'16"W, leg. S. Taiti, 17/XII/1984, MZUF 1733), 4 ♂♂, 2 ♀♀, Everglades, Shark Valley (25°45'49"N, 80°45'16"W, leg. S. Taiti, 17/XII/1984, MZUF 1734). Brazil: Sergipe: 4 ♀♀, Santo Amaro das Brotas (10°46'S, 37°03'W, leg. not identified, 10/IX/1978, in bromeliads, MZUSP 24369); Bahia: 17 ♂♂, 24 ♀♀, Salvador (13°00'S, 38°30'W, leg. E.M. da Silva, IX/2006, UFRGS 4436), 1 ♂, 6 ♀♀, Una, Reserva Biológica de Una (15°10'60"S, 39°03'46"W, leg. Brescovit and R. Pinto-da-Rocha, 13-16/IV/1998, MZUSP 24367); Espírito Santo: 1 ♂, 1 manca, Santa Tereza, Valsunga Velha, Estação Biológica Santa Lúcia (19°58'39"S, 40°32'06"W, leg. C.O. Azevedo et al., 10/IV/2001, sweeping net, point 37, at 755 meters of altitude, MZUSP 24382), 1 ♂, 1

♀, Santa Tereza, Valsunga Velha, Estação Biológica Santa Lúcia (leg. C.O. Azevedo et al., sweeping net, point 48, at 867 meters of altitude, 11/IV/2001, MZUSP 24384), 1 ♂, 1 ♀, Santa Tereza, Valsunga Velha, Estação Biológica Santa Lúcia (leg. C.O. Azevedo et al., sweeping net, point 1, at 867 meters of altitude, 11/IV/2001, MZUSP 24387), 1 ♂, 1 ♀, Santa Tereza, Valsunga Velha, Estação Biológica Santa Lúcia (leg. C.O. Azevedo et al., sweeping net, point 44, 11/IV/2001, MZUSP 24389), 3 ♂♂, 4 ♀♀, Santa Leopoldina (20°05'S, 40°30'W, leg. P.B. Araujo, 03/XI/2006, UFRGS 4212), 1 ♂, 7 ♀♀, Ibitirama, TecnoTruta (20°28'02"S, 41°43'49"W, leg. R. Pinto-da-Rocha, da Silva and Bragagnolo, 09/IV/2009, winckler extractor, at 1.100 meters of altitude, MZUSP 24380), 3 ♂♂, 2 ♀♀, Guarapari, Parque Estadual Paulo César Vinha (20°36'S, 40°28'W, leg. P.B. Araujo and J. Anza, 07/XI/2006, UFRGS 4213), 3 ♂♂, 11 ♀♀, 3 manca, Guarapari (20°39'S, 40°31'W, leg. H. Meinhardt, 08/XI/2006, UFRGS 4214), 2 ♂♂, 11 ♀♀, Meaípe (20°43'S, 40°32'W, leg. P.B. Araujo and H. Meinhardt, 07/XI/2006, UFRGS 4204); Minas Gerais: 1 ♀, Lagoa Santa (19°39'S, 43°56'W, leg. P.B. Araujo and J. Anza, 12/XI/2006, UFRGS 4208), 2 ♂♂, 2 ♀♀, 3 manca, Barão de Cocais (19°56'S, 43°28'W, leg. P.B. Araujo and J. Anza, 12/XI/2006, UFRGS 4211), 3 ♂♂, 10 ♀♀, 1 manca, Manhuaçu (20°16'S, 42°01'W, leg. P.B. Araujo, 12/XI/2006, UFRGS 4205), 2 ♂♂, 2 ♀♀, Santana do Riacho (19°07'S, 43°40'W, leg. P.B. Araujo and J. Anza, 13/XI/2006, UFRGS 4207); São Paulo: 11 ♂, 15 ♀♀, Campinas, Parque Ecológico Emílio José Salim (22°54'S, 47°01'W, leg. I.S. Campos-Filho and W.B.J. Beduchaud, 13/II/2010, UFRGS 4694), 1 ♂, 1 ♀, São Paulo, Indianópolis (22°57'S, 47°05'W, leg. M.C. Leite, 07/IV/1953, MZUSP 24370), 1 ♂, 3 ♀♀, Parque Estadual da Cantareira, Núcleo Pedra Grande (23°26'S, 46°39'W, leg. C.C. Aires et al., without date, large pitfall, MZUSP 24381), 1 ♂, 4 ♀♀, São Paulo (23°33'S, 46°39'W, leg. R.L. Araujo, 4/X/1950, MZUSP 24368), 1 ♂, 1 ♀, Peruíbe, Estação Ecológica da Juréia Itatins (24°17'S, 47°00'W, leg. A. Brescovit, 14-18/XII/1998, MZUSP 24375), 1 ♂, 2 ♀♀, Miracatu, Morro do Fau (24°18'S, 47°25'W, leg. R. Pinto-da-Rocha, R.S. Bérnils, E. Howaldt and M. Matsumoto, 19/XII/1998, MZUSP 24364), 1 ♀, Microbacia do Rio Quilombo, Estrada para Fazenda Capinzal (24°33'S, 48°05'W, leg. P. Giaspini, 18/II/1990, MZUSP 24376), 2 ♀♀, Parque Estadual Jacupiranga, Núcleo Cedro (24°35'S, 48°03'W, leg. P. Guinaspini, 17/II/1990, near to River Quilombo, MZUSP 24371), 6 ♂♂, 14 ♀♀, Iguape, Núcleo Despraiado (24°42'S, 47°35'W, leg. Bertani, Mestre and R. Pinto da Rocha, 29/IX-03/X/1997, MZUSP 24800), 1 ♀, Ilha do Cardoso (25°08'S, 47°58'W, leg. not identified, I/1979, south coast, litter 20, MZUSP 24378); Paraná: 6 ♂♂, 15 ♀♀, Toledo (24°43'S, 53°42'W, leg. A.F. Quadros, 06/II/2011, UFRGS 4828), 1 ♂, 1 ♀, Curitiba (25°26'S,

49°14'W, leg. J.T. Lisboa, 17/VII/2010, UFRGS 4708), 17 ♂♂, 27 ♀♀, 2 manca, Morretes, Parque Estadual do Pau Oco (25°29'S, 48°54'W, leg. R.R. Silva and B.H. Diète, 08-11/V/2002, MZUSP 24874); Santa Catarina: 2 ♂♂, 5 ♀♀, Itajaí, BR470 (26°56'S, 48°39'W, leg. A. Kury, R. Pinto-da-Rocha and A. Giupponi, 10/III/1999, MZUSP 24372), 14 ♂♂, 16 ♀♀, Seara (27°09'S, 52°18'W, leg. N. Cardoso, 04/I/2007, UFRGS 4699), 3 ♂♂, 3 ♀♀, Florianópolis (27°36'S, 48°32'W, leg. P.B. Araujo, 08/IX/1998, UFRGS 3694); Rio Grande do Sul: 1 ♂, 5 ♀♀, Três Passos (27°27'S, 53°55'W, leg. E.R.C. Lopes, 27/XI/1998, UFRGS 2563), 4 ♂♂, 35 ♀♀, Rondinha (28°43'S, 50°18'W, 03/XI/1998, UFRGS 2507), 2 ♀♀, Morrinhos do Sul (29°21'S, 49°55'W, leg. E.R.C. Lopes and A.O. Almeida, 27/XI/1998, UFRGS 2562), 4 ♂♂, 7 ♀♀, Don Pedro de Alcântara (29°23'S, 43°51'W, leg. E.R.C. Lopes, 03/III/1999, UFRGS 2584), 1 ♂, 3 ♀♀, Morro Azul (29°25'S, 49°58'W, leg. P.B. Araujo, E.R.C. Lopes and G. Bond-Buckup, 11/IX/1998, UFRGS 2502), 2 ♂♂, 10 ♀♀, Rincão dos Kroeff (29°27'S, 50°25'W, leg. E.R.C. Lopes, P.B. Araujo and G. Bond-Buckup, 11/IX/1998, UFRGS 2542), 11 ♂, 20 ♀♀, São Francisco de Paula (29°27'S, 50°36'W, leg. E.R.C. Lopes, 25/IX/1998, UFRGS 2608), 1 ♂, 13 ♀♀, Itapeva (29°31'14"S, 49°54'33"W, leg. E.R.C. Lopes, 25/IX/1998, UFRGS 2518), 9 ♂♂, 4 ♀♀, Arroio do Sal (29°32'S, 49°54'W, E.R.C. Lopes and M.A. Azevedo, 03/XI/1998, UFRGS 2506), 6 ♂♂, 19 ♀♀, Barra do Ouro (29°34'S, 50°16'W, leg. E.R.C. Lopes, P.B. Araujo and G. Bond-Buckup, 11/IX/1998, UFRGS 2535), 2 ♂♂, 3 ♀♀, Terra de Areia (29°36'S, 50°04'W, leg. P.B. Araujo, E.R.C. Lopes and G. Bond-Buckup, 10/IX/1998, UFRGS 2493), 3 ♂♂, 8 ♀♀, Arroio Teixeira (29°38'S, 49°56'W, leg. E.R.C. Lopes, G. Bond-Buckup and P.B. Araujo, 10/IX/1998, UFRGS 2490), 2 ♂♂, 5 ♀♀, Maquiné (29°40'S, 50°13'W, leg. M.A. Azevedo, 13/I/1999, UFRGS 2575), 13 ♂♂, 20 ♀♀, Porto Alegre, Lami (30°14'S, 51°06'W, leg. P.B. Araujo, IV/1997, UFRGS 2429).

Remarks

One of the most common characters used to distinguish *A. floridana* is its color pattern, especially the non-pigmented inverted U-shaped band on the cephalothorax. However, in some records a few specimens are described as not having this pattern. Recently, specimens from the Brazilian southern region, both the unpigmented and pigmented varieties, went through a molecular analysis with the gene *COI* in which significant genetic differences between the two variations were shown (B.L. Zimmermann 2012, personal communication).

To date, *Atlantoscia floridana* is the most widely distributed species of the genus. It is recorded from coastal regions of Florida, Brazil (states of Amapá, Pará, Tocantins, Rio Grande do Norte, Paraíba, Pernambuco, Bahia, Espírito

Santo, Minas Gerais, Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul), Argentina, and Ascension and St. Helena islands (Souza-Kury 1998; Schmalfuss 2003).

Atlantoscia rubromarginata Araujo and Leistikow (1999) (Fig. 12b)

Atlantoscia rubromarginata; Araujo and Leistikow, 1999:110, Figs 1–5; Leistikow 2001:6; Schmalfuss 2003:49.

Atlantoscia sp.; Leistikow and Araujo, 2001:332, Fig. 3 and plate 2.

Type material examined

Paratypes Brazil: Sergipe: 1 ♂, 2 ♀♀, Crasto, Santa Luzia do Itanhý (11°20'S, 37°26'W, leg. P.B. Araujo and C. Assis, 02/IV/1998, UFRGS 2319).

Additional material

Brazil: Alagoas: 3 ♂♂, 4 ♀♀, Quebrangulo, Rebio Pedra Talhada (9°15'34"S, 36°25'50"W, leg. R. Pinto-da-Rocha, Silva and Bragagnolo, 04/VII/2009, winckler extractor, MZUSP 24374); Sergipe: 3 ♂♂, 6 ♀♀, Areia Branca, Serra Itabaiana National Park (10°45'S, 37°20'W, leg. R. Pinto da Rocha and Bragagnolo, 28/VI/2009, MZUSP 24310); Bahia: 1 ♂, 1 ♀, Salvador, Farol de Itapuã (12°57'S, 38°21'W, leg. Yamje and Rebouças, between beach and dunes, in bromeliads on the ground, 13/XII/1962, MZUSP 24377), 4 ♂♂, 1 ♀, Salvador (12°59'S, 38°28'W, leg. I.S. Campos-Filho and W.B.J. Beduchaud, 04/II/2010, UFRGS 4707), 1 ♂, 2 ♀♀, Ituberá (13°44'S, 39°09'W, leg. M.C.L. Peres, UFRGS 4942), 9 ♂♂, 14 ♀♀, Ilhéus, Reserva Experimental CEPLAC (Comissão Executiva para o Plano da Lavoura Cacaueira – Executive Commission to Cocoa Tillage Plan) (14°45'19"S, 39°14'15"W, leg. J.T. Lisboa, 30/V/2008, in cocoa tillage plan, UFRGS 4529), 2 ♂♂, 3 ♀♀, Ibicarai (14°50'S, 39°35'W, leg. J.T. Lisboa, 29/XI/2009, UFRGS 4770), 2 ♀♀, Una (15°16'S, 39°09'W, leg. W.D. da Rocha, 06/V/2009, UFRGS 4739), 3 ♂♂, 13 ♀♀, Camacan, Serra Bonita Private Natural Heritage Reserve (15°23'S, 39°33'W, leg. R. Pinto da Rocha, Bragagnolo and da Silva, 24-26/VI/2009, MZUSP 24253), 2 ♂♂, 1 ♀, Canavieiras (15°40'S, 38°56'W, leg. J.T. Lisboa, 21/XII/2009, UFRGS 4737), 4 ♂♂, 4 ♀♀, Porto Seguro, Pau Brasil National Park (16°29'S, 39°12'W, leg. not identified, 23/VI/2009, MZUSP 24239).

Remarks

Atlantoscia rubromarginata was recorded only in the state of Sergipe, Brazil, and now the knowledge of its

geographical distribution has been extended up to the state of Bahia, Brazil.

Atlantoscia petronioi (Campos-Filho et al. 2012) (Fig. 12b)

Atlantoscia petronioi; Campos-Filho et al. 2012:138, Figs. 1–5.

Remarks

To date, *A. petronioi* is known only from the state of Rio Grande do Sul, Brazil.

Atlantoscia ituberasensis sp. n. (Figs 1–5, and 12c)

Etymology The specific name refers to the locality where the specimens were collected: Ituberá, Bahia, Brazil.

Type material

Holotype Brazil: Bahia: 1 ♂, Ituberá (13°44'S, 39°09'W, leg. M.C.L. Peres, IX/2009, MZUSP 24752). *Paratypes* 2 ♂♂, 2 ♀♀, same data as holotype (MZUSP 24753); 2 ♂♂, 14 ♀♀, same data as holotype (UFRGS 4832).

Diagnosis

A species of *Atlantoscia* characterized by the shape of male pleopod 1 endopod with distal part elongated and bent outwards versus straight on all other species.

Description of male

Maximum body length 4.2 mm and cephalothorax width 1.0 mm.

Body color light brown, lateral margins of coxal plates 1–7 with strongly pigmented areas; cephalothorax and antenna with irregular unpigmented areas; pereon with elongated unpigmented spots on median longitudinal part and central part of pereonites; pleon, pleotelson and uropods completely pigmented (Fig. 1a and b).

Body convex, smooth and bright, and covered with sparse piliform scale-setae. *Cephalothorax* with *linea supra-antennalis*, without *linea frontalis*, vertex arched, clypeus and labrum subequal, and eyes with 20–22 ommatidia arranged

Fig. 1 *Atlantoscia ituberasensis* sp. n., male (*paratype* MZUSP 24753). **a** Dorsal view; **b** cephalothorax, dorsal view; **c** cephalothorax, frontal view; **d** pleotelson; **e** coxal plates I–VII; **f** *nodulus lateralis*; **g** gland pores; **h** antennula; **i** antenna. Scale bars: **a** 1 mm; **b**, **c** 0.16 mm; **d**–**i**, 0.1 mm

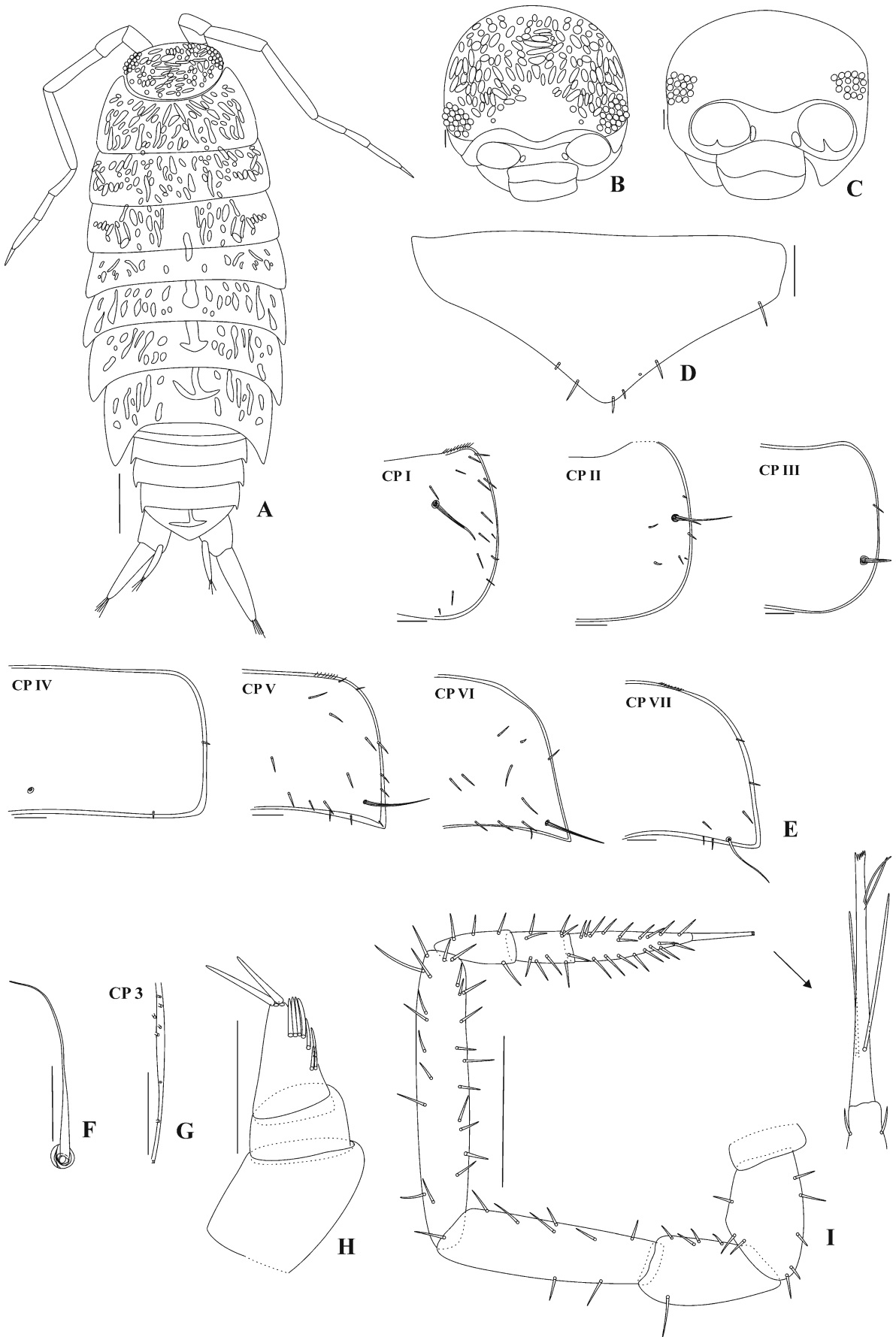
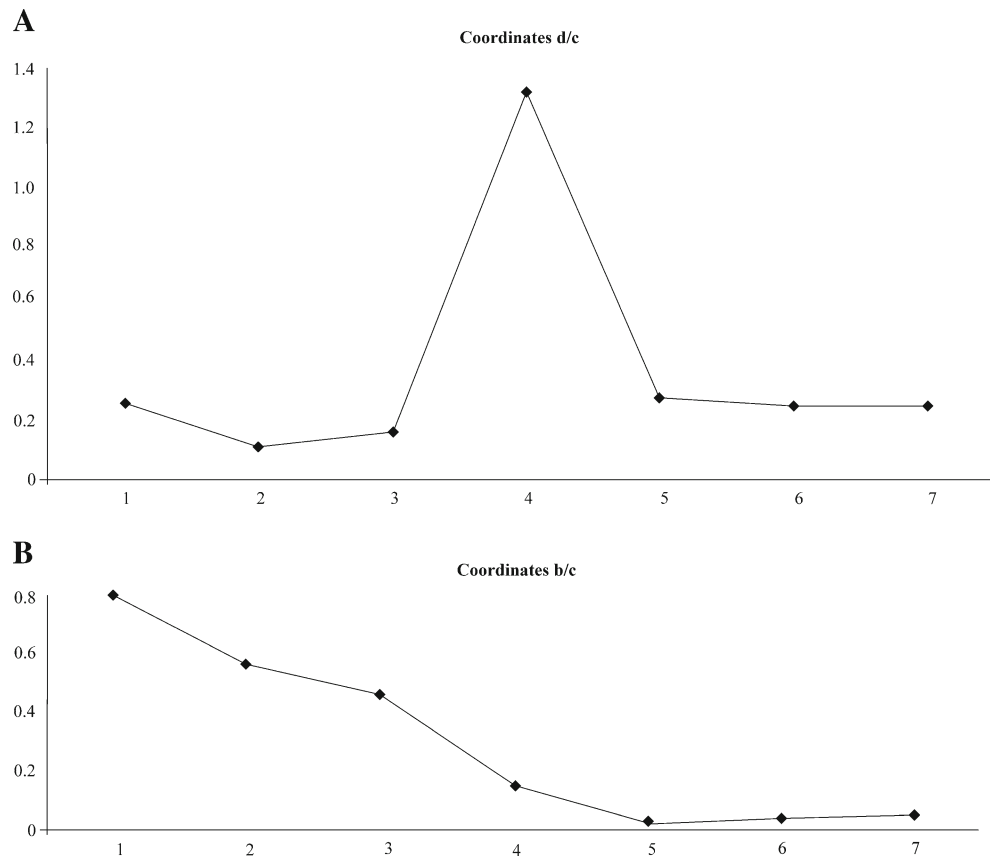


Fig. 2 *Atlantoscia ituberasensis* sp. n., male (paratype MZUSP 24753): *Noduli laterales*. **a** d/c coordinates; **b** b/c coordinates. Legend: *b* distance of the *nodulus lateralis* from posterior margin of the pereon segment, *c* length of the pereon tergite, *d* distance of the *nodulus lateralis* from the lateral margin of the pereon segment



in four rows (Fig. 1b, c). *Pleon* narrower than pereon, 3–5 neopleurae slightly developed (Fig. 1a). *Pleotelson* triangular with obtuse apex (Fig. 1d). *Noduli laterales* (Figs 1e, f and 2a, b) with d/c coordinates reaching a maximum on pereonite 4. *Coxal plates* with *sulcus marginalis* and glandular pores (Fig. 1e, g).

Antennula three-articulate, distal article longer than second, eight aesthetascs arranged in three rows plus one apical pair (Fig. 1h). *Antenna* reaching posterior margin of fourth pereonite when extended posteriorly; flagellum three-articulate, distal article longest, apical organ short, half of length of distal article of flagellum, free sensilla as long as cuticular sheath, inserted on the proximal quarter of the apical organ (Fig. 1i).

Mandibles with molar penicil consisting of at least six branches, *pars intermedia* with dense cushion of coniform setae, right and left mandibles with two penicils on incisor process (Fig. 3a, b).

Maxillula with medial endite with two slender penicils apically, distal part rounded; outer endite with 4+6 teeth (4 or 5 cleft, and 1 or 2 trifold), 1 slender seta and an accessory tooth (Fig. 3c).

Maxilla with lateral lobe twice as wide as the median lobe, robust and distally slightly sinuous; median lobe rounded and covered with trichiform setae (Fig. 3d).

Maxilliped base rectangular, with some sparse piliform scale-setae and distal margin truncate with a fringe of thin setae; endite quadrate, curved distal margin, one seta reaching the distal margin; distal margin with two hooks, minute setae, and longitudinal ridge bearing dense setae (Fig. 3e).

Pereopods rather slender, with sparse piliform scale-setae, hyaline fringe of scales; carpus 1 with transverse antennagrooming brush and 1 ornamental sensory seta with double serrate apex; setae sparse; ischium 7 triangular, with 2 long setae; dactylus 1–7 with long inner claw, reaching distal margin of outer claw, dactylar organ with spatulate apex, and unguis simple overpassing inner claw (Fig. 4a–c).

Pleopods 1–5 with respiratory areas.

Pleopod 1 exopod heart-shaped, outer margin without setae, medially concave and rounded apex; endopod slender with distal part elongated, bent outwards and bearing sparse minute setae (Fig. 5a, b).

Pleopod 2 exopod triangular with five setae and distal part elongated; endopod slender, reaching the fourth pleopod and bearing a serrate cuticular plaque subapically (Fig. 5c).

Fig. 3 *Atlantoscia ituberasensis* sp. n., male (paratype MZUSP 24753). **a** Left mandible; **b** right mandible; **c** maxillula; **d** maxilla; **e** maxilliped. Scale bars: 0.1 mm

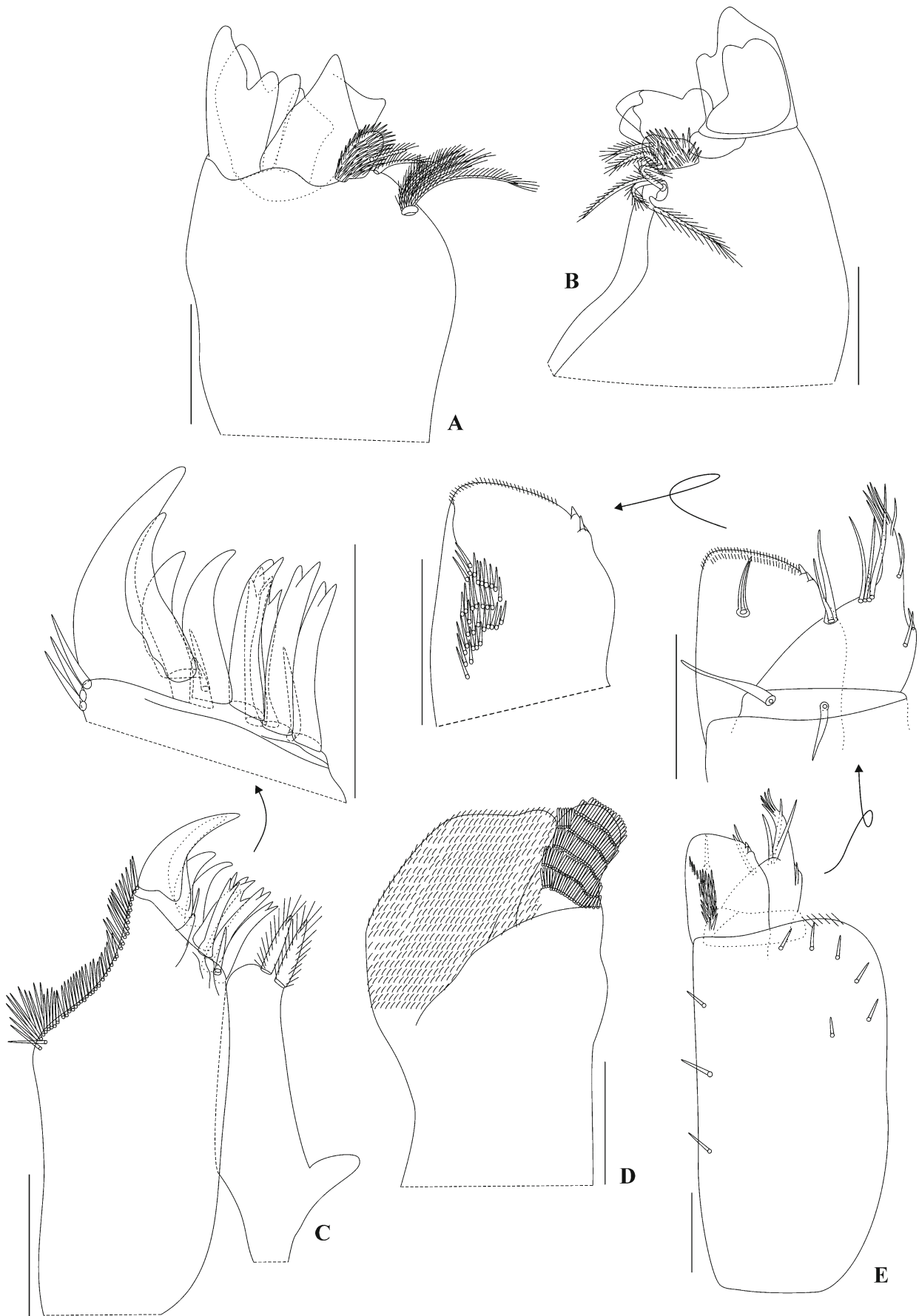
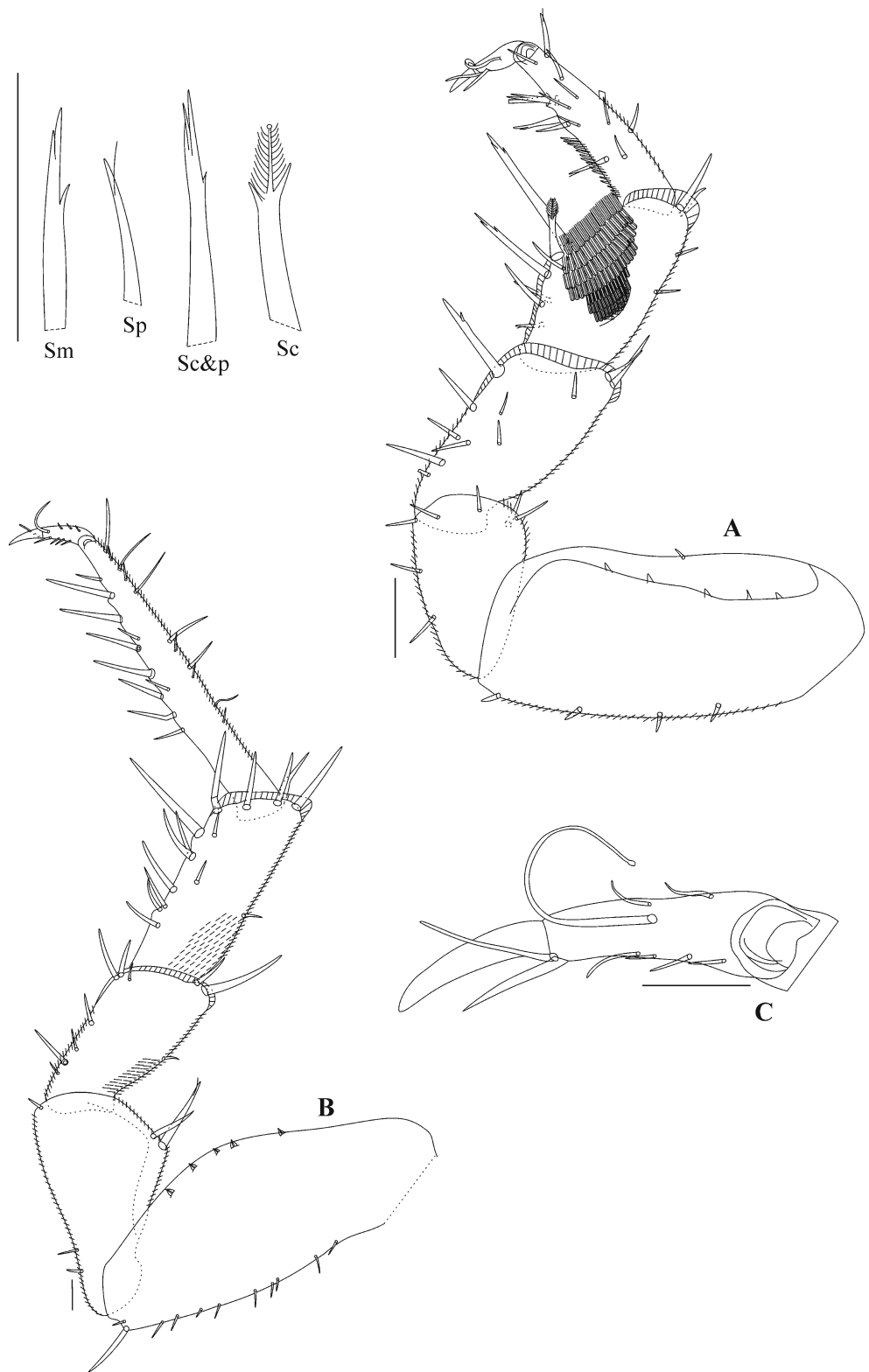


Fig. 4 *Atlantoscia ituberasensis* sp. n., male (paratype MZUSP 24753). **a** Pereopod 1; **b** pereopod 7; **c** dactylus. *Sm* setae on merus, *Sc* seta on carpus, *Sp* setae on propodus, *Sc&p* setae on carpus and propodus. Scale bars: 0.1 mm

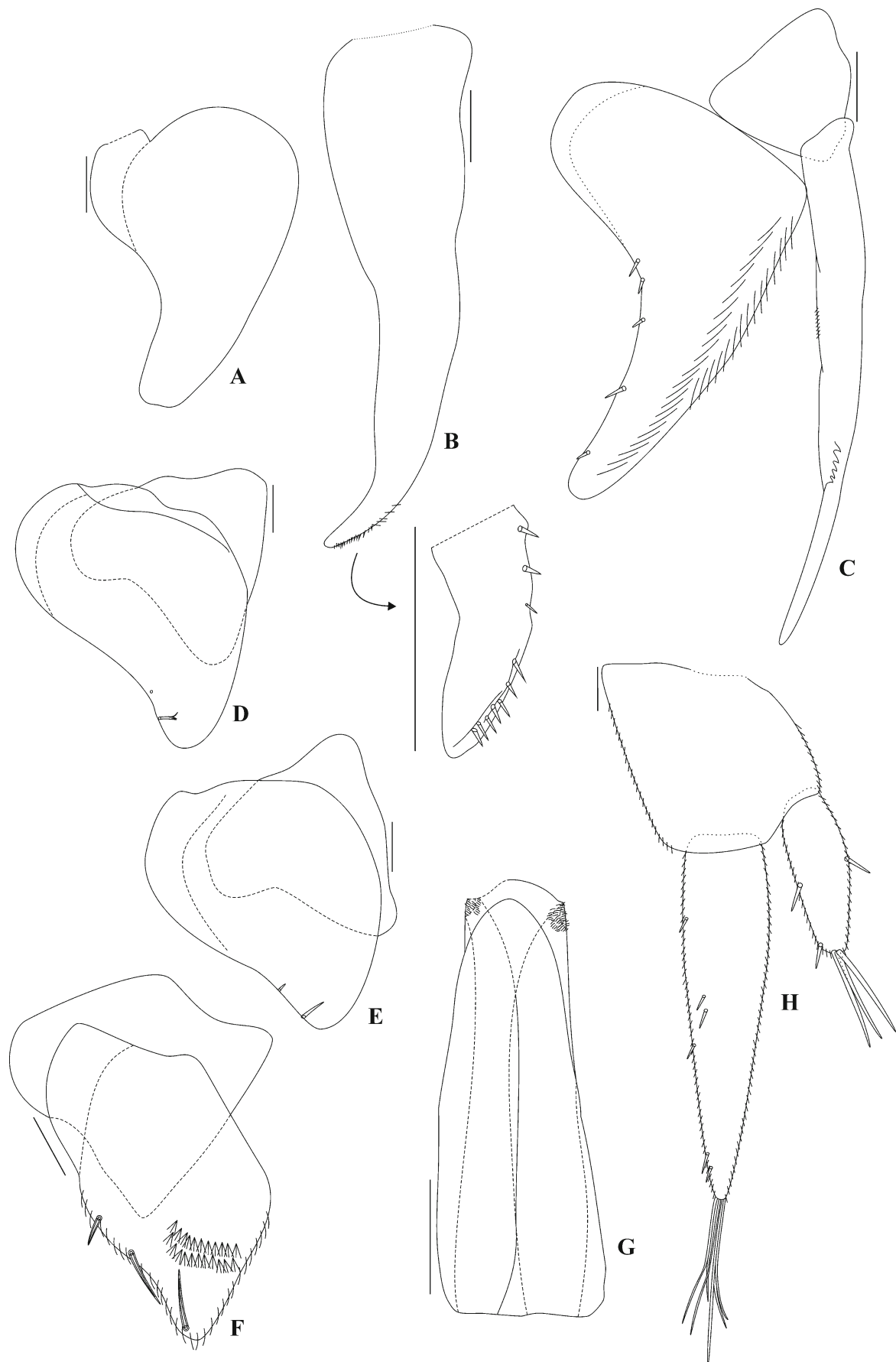


Pleopods 3 and 4 as illustrated (Fig. 5d, e).

Pleopod 5 exopod triangular, with outer margin sinuous, bearing three setae and transverse plumose fringe (Fig. 5f).

Genital papilla with ventral shield and subapical orifices with spines (Fig. 5g).

Fig. 5 *Atlantoscia ituberasensis* sp. n., male (paratype MZUSP 24753). **a** Pleopod 1 exopod; **b** pleopod 1 endopod; **c** pleopod 2; **d** pleopod 3; **e** pleopod 4; **f** pleopod 5; **g** genital papilla; **h** uropod. Scale bars: 0.1 mm



Uropod protopod with inner medial sulcus without setae; endopod with sparse setae along inner and outer margins and with three setae on apex; exopod two times longer than endopod, with five setae on apex (Fig. 5h).

Description of female

Maximum body length 8.7 mm. Cephalothorax width 1.62 mm. Similar to male except in sexual characters.

Remarks

The new species resembles *A. floridana* in number of aesthetascs on antennula and in shape of male pleopod 1 exopod, *A. rubromarginata* in having a serrate cuticular plaque on the male pleopod 2 endopod, and *A. petronioi* in the shape of the male pleopod 1 exopod and the outer endite of the maxillula with an accessory tooth and slender seta. It can be distinguished by the male pleopod 1 endopod with distal part elongated and apex bent outwards.

Atlantoscia sulcata sp. n. (Figs 6, 7, 8, 9, 10, 11, and 12)

Etymology The specific name refers to the typical characteristic of this species, the longitudinal *sulcus* on pereopods.

Type material

Holotype Brazil: São Paulo: 1 ♂, Paranapiacaba, Reserva Biológica de Paranapiacaba (23°46'S, 46°18'20"W, leg. M.J. Magrini and M. Uehara-Prado, 03/I/2006, MZUSP 24754). **Paratypes** Brazil: São Paulo: 1 ♀, same data as holotype (MZUSP 24755), 2 ♂♂, same data as holotype (20/IV/2006, UFRGS 4869), 1 ♀, Salesópolis, Estação Biológica de Boracéia (23°39'10"S, 45°53'20"W, leg. M.J. Magrini and M. Uehara-Prado, 27/III/2005, MZUSP 24756), 1 ♂, Salesópolis, Estação Biológica de Boracéia (leg. M.J. Magrini and M. Uehara-Prado, 09/XII/2005, MZUSP 24757), 1 ♂, Salesópolis, Estação Biológica de Boracéia (leg. M.J. Magrini and M. Uehara-Prado, 09/XII/2005, MZUSP 24758), 1 ♂, Salesópolis, Estação Biológica de Boracéia (leg. M.J. Magrini and M. Uehara-Prado, 25/V/2006, MZUSP 24759), 1 ♂, 5 ♀♀, Salesópolis, Estação Biológica de Boracéia (leg. M.J. Magrini and M. Uehara-Prado, 25/V/2006, UFRGS 4870), 1 ♂, 3 ♀♀, 1 manca, Parque das Neblinas (23°44'S, 46°09'W, 20/III/2006, UFRGS 4944), 1 ♂, 1 ♀, Parque das Neblinas (20/III/2006, UFRGS 4946), 1 ♂, 1 ♀, Parque das Neblinas (20/III/2006, UFRGS 4952), 3 ♂♂, 2 ♀♀, Parque das Neblinas (20/III/2006, UFRGS 4954), 1 ♀, 3 manca, Parque das

Neblinas (20/III/2006, UFRGS 4945), 1 ♀, Parque das Neblinas (20/III/2006, UFRGS 4947), 1 ♀, Parque das Neblinas (20/III/2006, UFRGS 4948), 1 ♀, Parque das Neblinas (20/III/2006, UFRGS 4949), 1 ♀, Parque das Neblinas (20/III/2006, UFRGS 4950), 1 ♂, Parque das Neblinas (20/III/2006, UFRGS 4951), 1 ♂, Parque das Neblinas (20/III/2006, UFRGS 4953), 1 ♂, 2 ♀♀, Parque das Neblinas (20/III/2006, UFRGS 4955), 1 ♂, 2 ♀♀, Parque das Neblinas (20/III/2006, UFRGS 4956), 2 ♀♀, Parque das Neblinas (20/III/2006, UFRGS 4958), 1 ♂, Parque das Neblinas (20/III/2006, UFRGS 4959), 1 ♂, 1 ♀, Parque das Neblinas (20/III/2006, UFRGS 4960), 1 ♂, 2 ♀♀, Parque das Neblinas (20/III/2006, UFRGS 4961), 3 ♀♀, Parque das Neblinas (20/III/2006, UFRGS 4962), 1 ♂, Parque das Neblinas (20/IV/2006, UFRGS 4970), 1 ♂, Parque das Neblinas (11/II/2006, UFRGS 4971), 1 ♂, Parque das Neblinas (01/XI/2005, UFRGS 4972), 1 ♂, Parque das Neblinas (01/XI/2005, UFRGS 4973), 1 ♂, Parque das Neblinas (01/XI/2005, UFRGS 4974), 1 ♂, Parque das Neblinas (19/II/2005, UFRGS 4975), 1 ♂, Parque das Neblinas (20/XI/2006, UFRGS 4976), 1 ♂, Parque das Neblinas (17/V/2006, UFRGS 4977), 1 ♂, Parque das Neblinas (01/XI/2005, UFRGS 4978), 1 ♂, Parque das Neblinas (03/I/2006, UFRGS 4979), 2 ♂♂, Parque das Neblinas (11/II/2006, UFRGS 4980), 2 ♂♂, 1 ♀, Parque das Neblinas (20/IV/2006, UFRGS 4981), 2 ♂♂, 1 ♀, Parque das Neblinas (11/II/2006, UFRGS 4982), 2 ♂♂, 1 ♀, Parque das Neblinas (11/II/2006, UFRGS 4983), 2 ♂♂, 1 ♀, Parque das Neblinas (01/XII/2005, UFRGS 4984), 1 ♀, Parque das Neblinas (17/V/2006, UFRGS 4985), 1 ♀, Parque das Neblinas (20/XI/2004, UFRGS 4986), 1 ♀, Parque das Neblinas (18/II/2005, UFRGS 4987), 1 ♀, Parque das Neblinas (17/II/2005, UFRGS 4988), 1 ♀, Parque das Neblinas (17/V/2005, UFRGS 4989), 1 ♀, 2 manca, Parque das Neblinas (23/V/2005, UFRGS 4990), 1 ♀, Parque das Neblinas (21/V/2005, UFRGS 4991), 1 ♀, Parque das Neblinas (20/XI/2004, UFRGS 4992), 1 ♀, Parque das Neblinas (20/IV/2006, UFRGS 4993), 1 ♀, Parque das Neblinas (17/V/2006, UFRGS 4994), 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 4995), 1 ♀, Parque das Neblinas (20/IV/2006, UFRGS 4996), 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 4997), 1 ♀, Parque das Neblinas (20/IV/2006, UFRGS 4998), 1 ♀, Parque das Neblinas (11/II/2006, UFRGS 4999), 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 5000), 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 5001), 1 ♀, Parque das Neblinas (20/IV/2006, UFRGS 5002), 1 ♀,

Fig. 6 *Atlantoscia sulcata* sp. n., male (holotype MZUSP 24754). **a** Dorsal view (paratype MZUSP 24757); **b** cephalothorax, dorsal view; **c** cephalothorax, frontal view; **d** pleotelson; **e** coxal plates I–VII; **f** *nodulus lateralis*; **g** gland pores; **h** antennula; **i** antenna. Scale bars: **a**, 1 mm; **b**, **c**, 0.16 mm; **d**–**i**, 0.1 mm

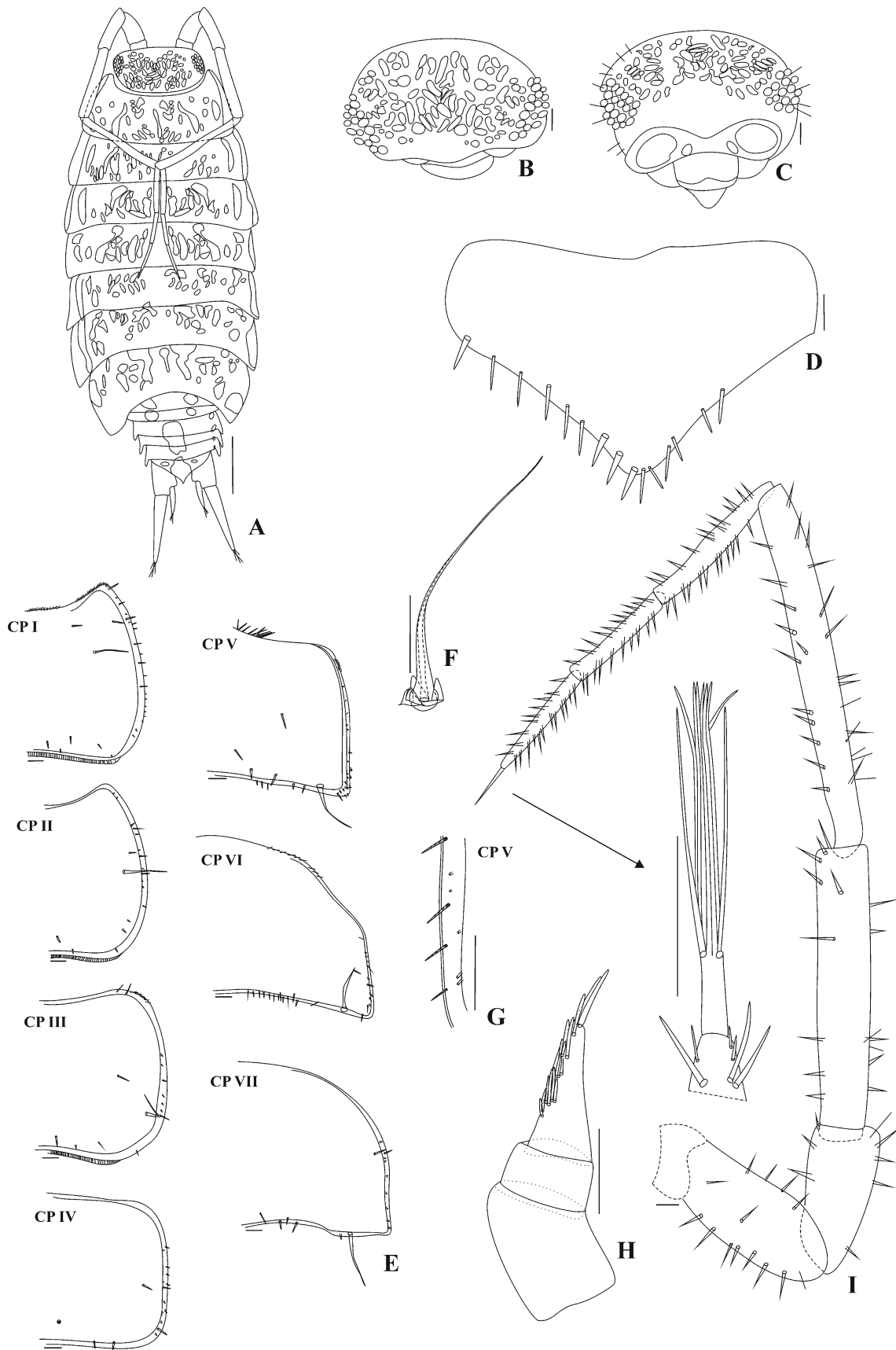
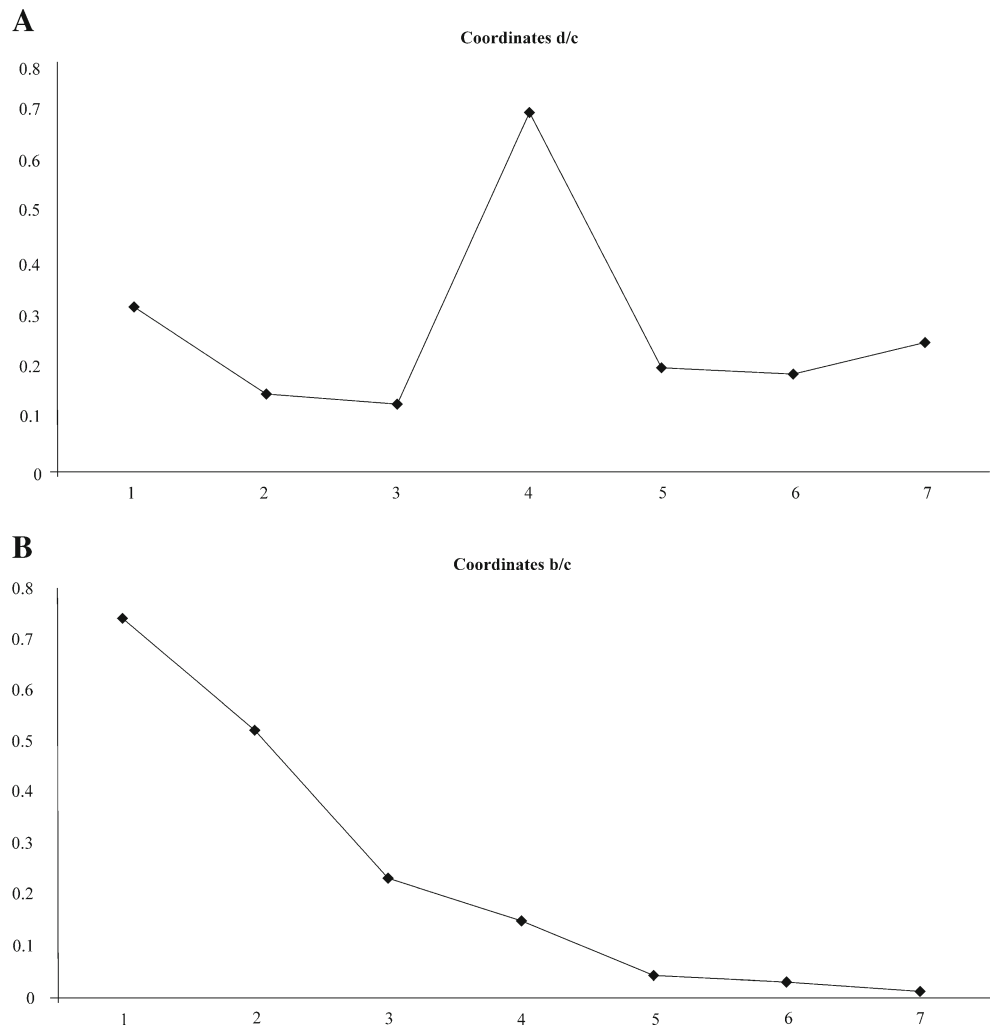


Fig. 7 *Atlantoscia sulcata* sp. n., male (*paratype* MZUSP 24757): *Noduli laterales*. **a** d/c coordinates; **b** b/c coordinates. Legend: *b* distance of the *nodulus lateralis* from posterior margin of the pereon segment, *c* length of the pereon tergite; *d* distance of the *nodulus lateralis* from the lateral margin of the pereon segment



Parque das Neblinas (20/IV/2006, UFRGS 5003), 1 ♀, 3 manca, Parque das Neblinas (11/II/2006, UFRGS 5004), 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 5005), 1 ♀, Parque das Neblinas (20/IV/2006, UFRGS 5006), 1 ♀, Parque das Neblinas (17/V/2006, UFRGS 5007), 1 ♀, Parque das Neblinas (20/IV/2006, UFRGS 5008), 1 ♀, Parque das Neblinas (20/IV/2006, UFRGS 5009), 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 5010), 1 ♀, Parque das Neblinas (03/I/2006, UFRGS 5011), 1 ♀, Parque das Neblinas (11/II/2006, UFRGS 5012), 1 ♀, Parque das Neblinas (03/I/2006, UFRGS 5013), 1 ♀, Parque das Neblinas (01/XII/2006, UFRGS 5014), 1 ♀, Parque das Neblinas (01/XII/2006, UFRGS 5015), 1 ♀, Parque das Neblinas (03/I/2006, UFRGS 5016), 1 ♀, Parque das Neblinas (03/I/2006, UFRGS 5017), 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 5018), 1 ♀, Parque das Neblinas (11/II/2006, UFRGS 5019), 1 ♀, Parque das Neblinas (10/IV/2005, UFRGS 5020), 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 5021), 1 ♂, 6 ♀♀, Parque das Neblinas (11/II/2006, UFRGS 5022), 1 ♂, 5 ♀♀, Parque das Neblinas (11/II/2006, UFRGS 5023), 2 ♀♀, Parque das

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Fig. 8 *Atlantoscia sulcata* sp. n., male (*paratype* MZUSP 24757). **a** Left mandible; **b** right mandible; **c** maxillula; **d** maxilla; **e** maxilliped. Scale bars: 0.1 mm



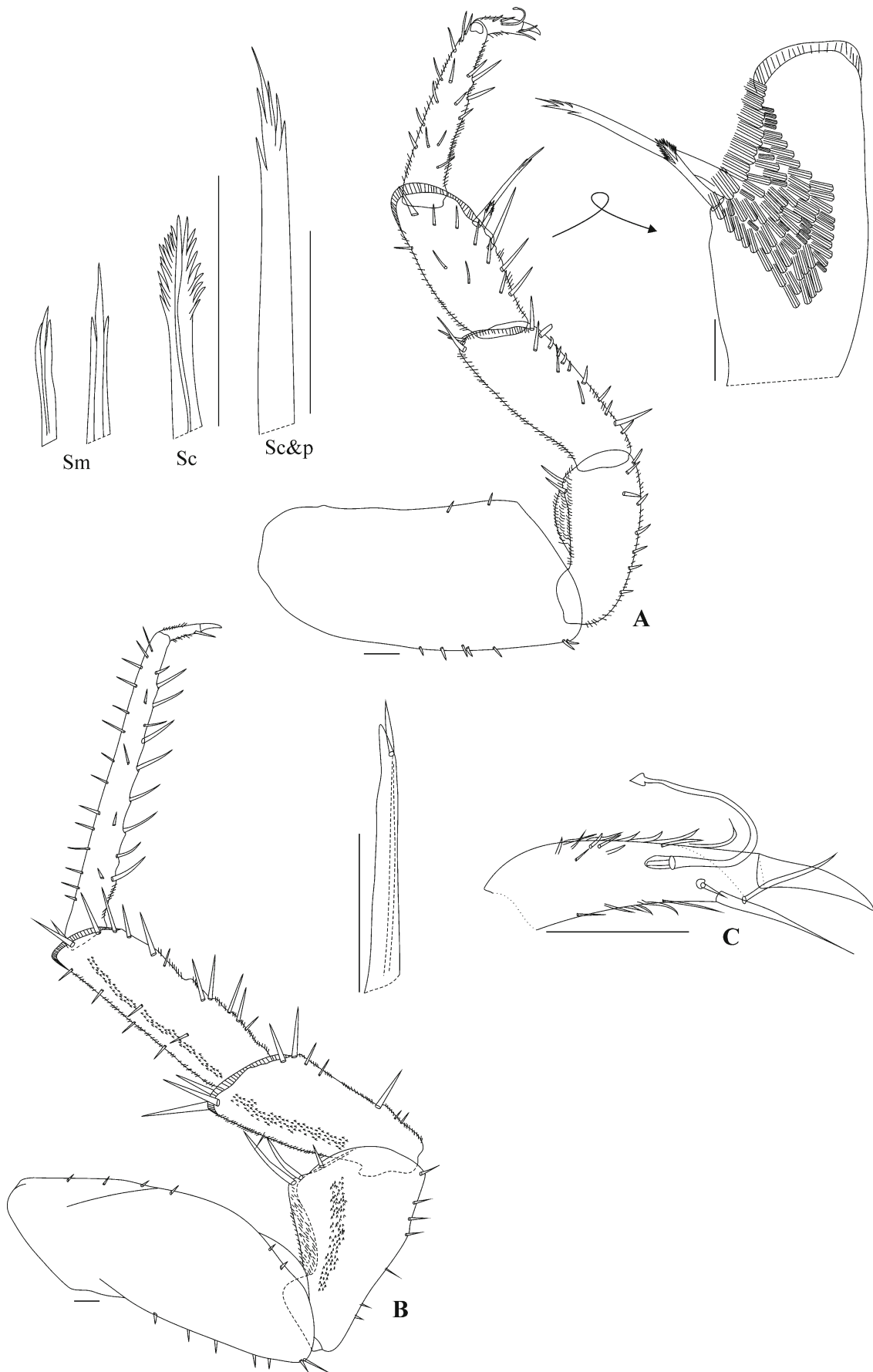
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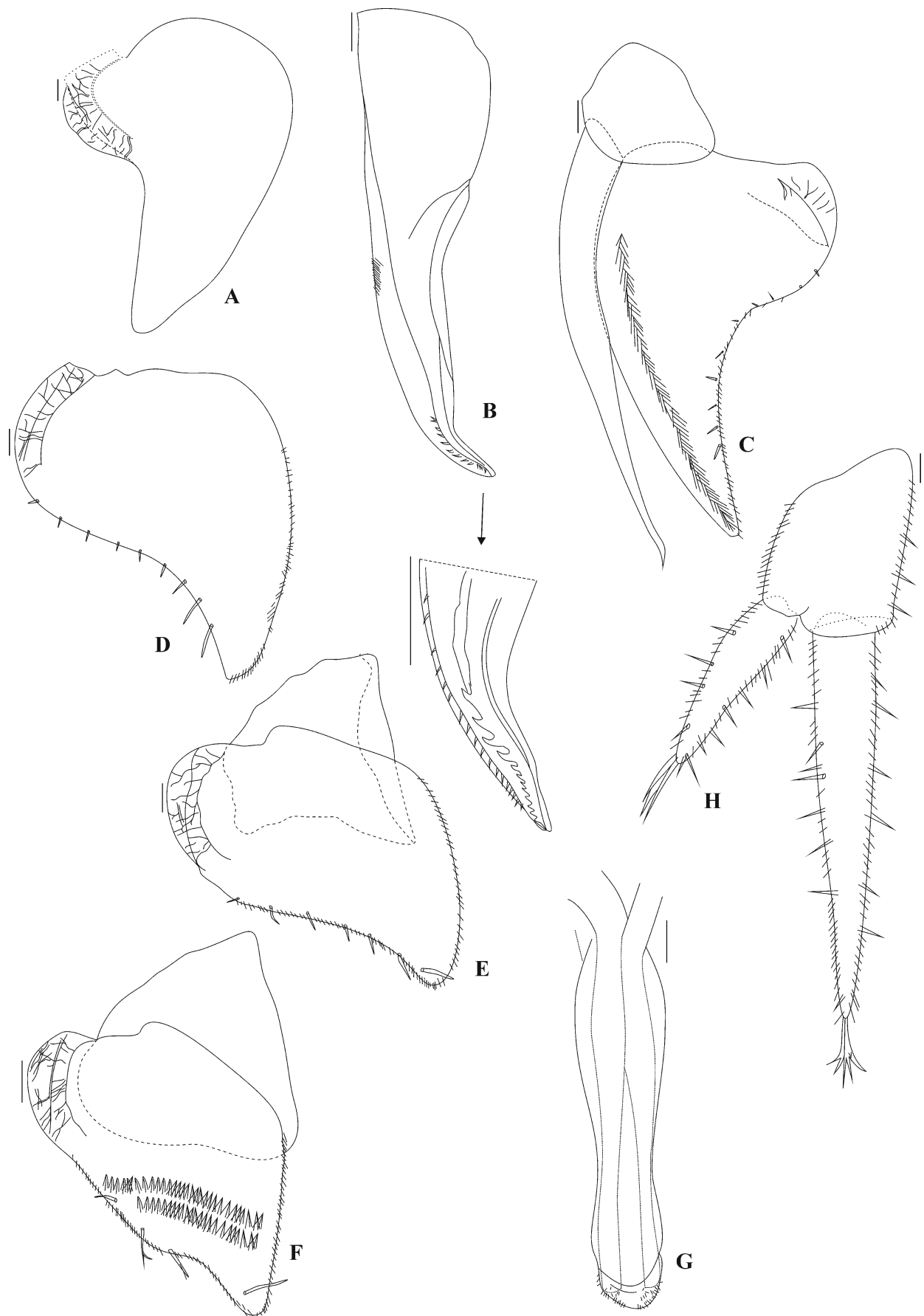
Fig. 9 *Atlantoscia sulcata* sp. n., male (paratype MZUSP 24757). **a** Pereopod 1; **b** pereopod 7; **c** dactylus. *Sm* setae on merus, *Sc* seta on carpus, *Sc&p* setae on carpus and propodus. Scale bars: 0.1 mm

Neblinas (03/I/2006, UFRGS 5093), 1 ♂, 2 ♀♀, Parque das Neblinas (01/XI/2006, UFRGS 5094), 1 ♂, 1 ♀, Parque das Neblinas (11/II/2006, UFRGS 5106), 1 ♂, 1 ♀, Parque das Neblinas (17/V/2006, UFRGS 5107), 1 ♂, 1 ♀, Parque das Neblinas (11/II/2006, UFRGS 5108), 1 ♂, 1 ♀, Parque das Neblinas (20/IV/2006, UFRGS 5109), 1 ♂, 1 ♀, Parque das Neblinas (20/IV/2006, UFRGS 5110), 1 ♂, 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 5111), 1 ♂, 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 5112), 1 ♂, 1 ♀, Parque das Neblinas (13/IV/2005, UFRGS 5113), 1 ♂, 1 ♀, Parque das Neblinas (13/IV/2005, UFRGS 5114), 1 ♂, 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 5115), 1 ♂, 1 ♀, Parque das Neblinas (03/I/2006, UFRGS 5116), 1 ♂, 1 ♀, Parque das Neblinas (03/I/2006, UFRGS 5117), 1 ♂, 1 ♀, Parque das Neblinas (01/XII/2005, UFRGS 5118), 1 ♂, 1 ♀, Parque das Neblinas (01/XI/2005, UFRGS 5119), 1 ♂, 1 ♀, Parque das Neblinas (12/VI/2006, UFRGS 5120), 1 ♂, 1 ♀, Parque das Neblinas (01/XI/2006, UFRGS 5121), 1 ♂, 1 ♀, Parque das Neblinas (17/V/2006, UFRGS 5111).

Additional material

Brazil: São Paulo: 1 ♂, 3 ♀♀, Salesópolis, Estação Biológica de Boracéia (BIOTA/FAPESP Project) (leg. Casari AND Francini, 01-28/XI/2001, MZUSP 24264), 2 ♂♂, 2 ♀♀, Salesópolis, Estação Biológica de Boracéia, Trilha do Laboratório (BIOTA/FAPESP Project) (leg. S.T.P. Amarante and team, 01/IV/2001, scan net collect technique, MZUSP 24304), 20 ♂♂, 22 ♀♀, Salesópolis, Estação Biológica de Boracéia, Trilha dos Pilões (BIOTA/FAPESP Project) (leg. S.T.P. Amarante and team, 01/IV/2001, Moericke trap – Point 6, MZUSP 24304), 4 ♂♂, 2 ♀♀, Salesópolis, Estação Biológica de Boracéia, Trilha do Poço Verde (BIOTA/FAPESP Project) (leg. S.T.P. Amarante and team, 04/IV/2001, scan net collect technique, MZUSP 24305), 3 ♂♂, 2 ♀♀, Salesópolis, Estação Biológica de Boracéia, Trilha do Poço Verde (BIOTA/FAPESP Project) (leg. S.T.P. Amarante and team, 04/IV/2001, scan net collect technique, MZUSP 24306), 9 ♂♂, 14 ♀♀, 2 mancás, Salesópolis, Estação Biológica de Boracéia, Trilha do Poço Verde (BIOTA/FAPESP Project) (leg. S.T.P. Amarante and team, 01/IV/2001, scan net collect technique, MZUSP 24307), 2 ♂♂, 2 ♀♀, Salesópolis, Estação Biológica de Boracéia, Trilha dos Pilões (BIOTA/FAPESP Project) (leg. S.T.P. Amarante and team, 01-03/IV/2001, Moericke trap, MZUSP 24308), 7 ♂♂, 14 ♀♀, Salesópolis, Estação Biológica de Boracéia (BIOTA/FAPESP Project) (leg. R. Pinto-da-Rocha, Ramirez and Bérnils, 26-28/I/1999, MZUSP 24320), 4 ♂♂, 10 ♀♀, Cananéia, Ilha do Cardoso (25°08'S, 47°58'W, leg. not identified, 1979, MZUSP 24799).





◀ **Fig. 10** *Atlantoscia sulcata* sp. n., male (paratype MZUSP 24757). **a** Pleopod 1 exopod; **b** pleopod 1 endopod; **c** pleopod 2; **d** pleopod 3; **e** pleopod 4; **f** pleopod 5; **g** genital papilla; **h** uropod. Scale bars: 0.1 mm

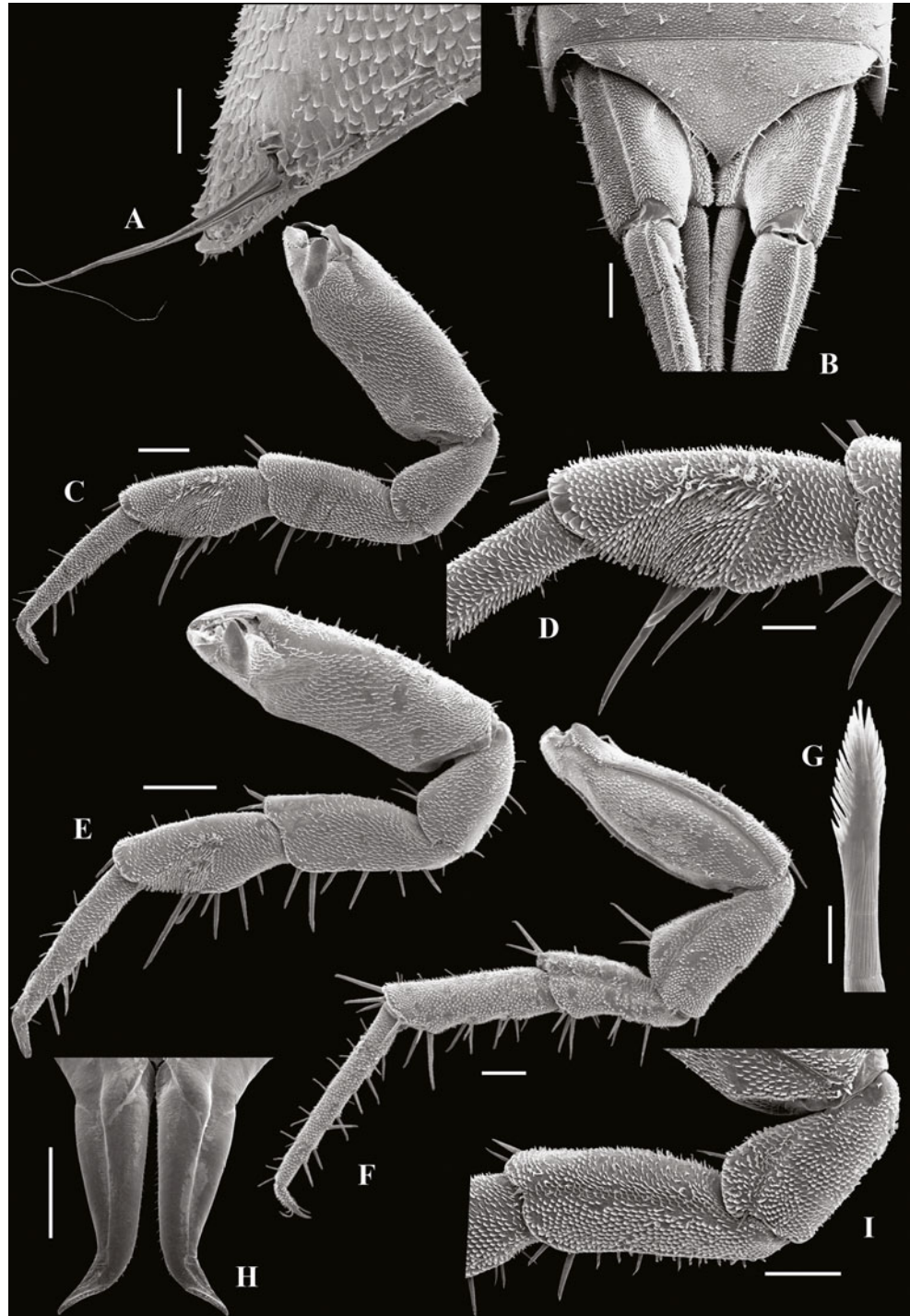
Note

The additional material belonging to Parque das Neblinas, state of São Paulo, Brazil, was collected by Mariana J. Magrini and Marcio Uehara-Prado.

Diagnosis

A species of *Atlantoscia* characterized by pleotelson with right-angled apex and a rhombus-like unpigmented spot on distal portion versus rounded in *A. floridana* and *A. rubromarginata*, and acute in *A. petronioi*, antennula with 14+2 aesthetascs versus 8+2 in *A. floridana* and *A. ituberasensis*, 12+2 in *A. petronioi* and 3+1 in *A. rubromarginata*, pereopods with ventral

Fig. 11 *Atlantoscia sulcata* sp. n., male (scanning electron micrograph). **a** *Nodus lateralis*; **b** pleotelson; **c, d**, pereopod 1; **f** pereopod 7; **g** ornamental sensory seta with double serrate apex; **h** pleopod 1 endopod; female; **e** pereopod 1; **i** pereopod 7. Scale bars: 100 μ m



sulcus, more visible on ischium and merus of pereopod 7 versus absent in all other species, dactylar organ with arrow-like apex versus knob-like apex in all other species.

Description of male

Maximum body length 8 mm and cephalothorax width 1.6 mm.

Body color chestnut, pereonites 5–7 and pleon with strongly pigmented areas; cephalothorax with irregular unpigmented areas; pereon with elongated unpigmented spots on median portion; coxal plates lighter than median and central areas; pleonites 1 and 2 with 2 unpigmented spots, and pleonites 3–5 with one central unpigmented spot; pleotelson with a rhombus-like unpigmented spot on distal portion (Fig. 6a–c).

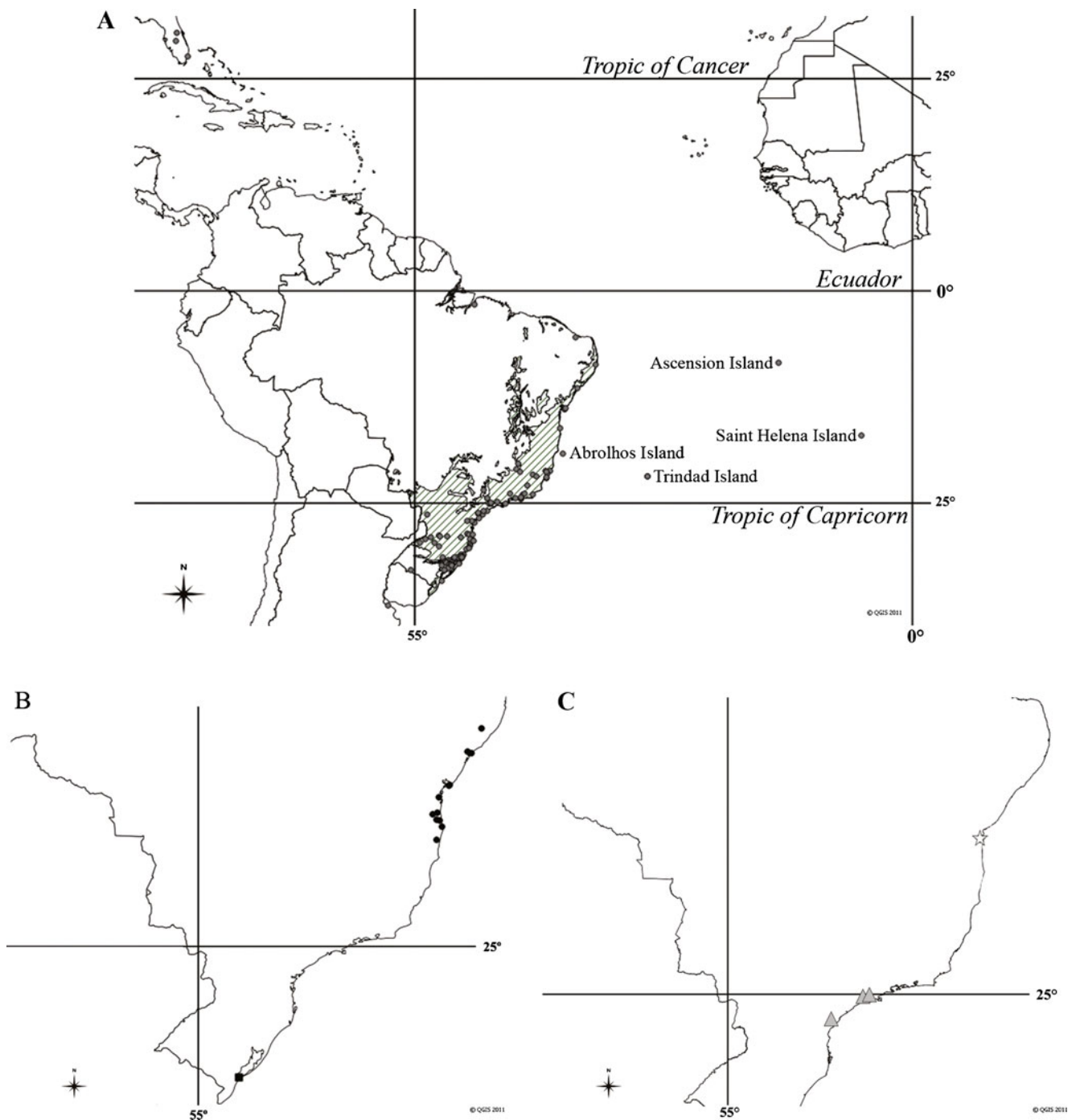


Fig. 12 Geographical distribution of *Atlantoscia floridana* (a), *Atlantoscia rubromarginata* (●) and *Atlantoscia petronioi* (■) (b), and *Atlantoscia ituberasensis* (☆) and *Atlantoscia sulcata* (▲) (c). Dashed area: Atlantic Forest

Body shape convex, smooth and bright and covered with sparse piliform scale-setae (Fig. 6a). Cephalothorax with *linea supra-antennalis*, without *linea frontalis*, vertex arched, clypeus and labrum subequal, and eyes with 22 ommatidia arranged in four rows (Fig. 6b, c). Pleon narrower than pereon, 3–5 neopleurae well-developed (Fig. 6a). Pleotelson triangular, straight margins and right-angled apex (Figs 6d and 11b). *Noduli laterales* (Figs. 6e, f, 7a, b and 11a) with d/c coordinates reaching a maximum on pereonite 4. Coxal plates with *sulcus marginalis* and glandular pores (Fig. 6e, g).

Antennula three-articulate, distal article the longest, 14 aesthetascs arranged in 5 rows plus one apical pair (Fig. 6h). Antenna reaching posterior margin of sixth pereonite when extended posteriorly; flagellum three-articulate, proximal article longest, apical organ short, one third as long as distal article of flagellum, free sensilla as long as cuticular sheath, inserted on the proximal quarter of the apical organ (Fig. 6i).

Mandibles with molar penicil consisting of at least six branches, *pars intermedia* with dense cushion of coniform setae, left mandible with four penicils on incisor process and right with two penicils (Fig. 8a, b).

Maxillula with medial endite with 2 slender penicils apically, distal part rounded, outer endite with 4+6 teeth, 5 teeth of inner set cleft (Fig. 8c).

Maxilla with lateral lobe twice as wide as the median lobe, robust, and distal margin slightly sinuous; median lobe quadrate, with distal margin rounded and covered with trichiform setae (Fig. 8d).

Maxilliped base rectangular, cuticle scaled, with sparse piliform scale-setae, and distal margin slightly sinuous with fringe of thin setae; endite quadrate, curved distal margin, with two hooks, one seta reaching the distal margin and longitudinal ridge bearing dense setae (Fig. 8e).

Pereopods rather slender, with sparse piliform scale-setae, fringe of hyaline scales, and ventral *sulcus*, more evident on pereopod 7; transverse antenna-grooming brush on carpus 1, and 1 ornamental sensory seta with double serrate apex; merus 1–3 with slightly sparse setae, and carpus 1–3 with sparse setae; ischium 7 triangular, elongated, with 3–4 long setae; dactylus 1–7 with long inner claw, reaching distal margin of outer claw, dactylar organ longer than outer claw, with arrow-like pointed apex and unguis simple, not overpassing inner claw (Figs 9a–c and 11c–g, i).

Pleopods 1–5 with respiratory areas.

Pleopod 1 exopod heart-shaped, with distal portion elongated and rounded apex, outer margin without setae; endopod robust, with distal part elongated, bearing sparse minute setae on the inner margin, spermatid channel crenulate subapically, and bent outwards (Figs 10a, b and 11h).

Pleopod 2 exopod triangular, with approximately 12 setae, distal part elongated with narrow rounded apex; endopod slender, reaching the third or fourth pleopod, and pointed apex (Fig. 10c).

Pleopods 3 and 4 as illustrated (Fig. 10d, e).

Pleopod 5 exopod rhomboid, with outer margin sinuous, bearing four setae and transverse plumose fringe (Fig. 10f).

Genital papilla with ventral shield and subapical orifices with setae (Fig. 10g).

Uropods, protopod with inner medial sulcus without setae; exopod twice longer than endopod, with six sensory setae on apex, and endopod with three sensory setae on apex (Fig. 10h).

Description of female

Maximum body length 10 mm. Cephalothorax width 1.75 mm. Similar to male except in sexual characters.

Remarks

The new species resembles *A. floridana* and *A. petronioi* by sharing the spermatid channel crenulate subapically on male pleopod 1 endopod and *A. ituberasensis* in the shape of male pleopod 1 endopod. It can be distinguished by the shape of pleotelson and a rhomboid unpigmented spot on distal portion, antennula with 14+2 aesthetascs, pereopods 1–7 with ventral *sulcus* more visible on pereopod 7, and dactylar organ with arrow-like apex.

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