

New species and new records of terrestrial isopods (Crustacea, Isopoda, Oniscidea) from Brazil

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ABSTRACT. A large collection of terrestrial isopods from different Brazilian regions was examined. Two new species of *Amazoniscus* Lemos de Castro, 1967 (Scleropactidae) are described: *A. zimmeri* Campos-Filho, Montesanto & Araujo sp. nov. from the state of Pará and *A. schmidtii* Campos-Filho, Montesanto & Taiti sp. nov. from the state of Minas Gerais. *Pseudotyphloscia alba* (Dollfus, 1898) (Philosciidae) is firstly recorded from Brazil. The systematic position of *Venezillo tuberosus* (Budde-Lund, 1904) is discussed and transferred to *Ctenorillo* Verhoeff, 1942. *Androdeloscia lejeunei* (Lemos de Castro & Souza, 1986) and *Diploexochus echinatus* Brandt, 1833 from the state of Pará, are redescribed.

KEYWORDS. Neotropic, Amazonian tropical rainforest, Atlantic forest.

RESUMO. Novas espécies e novos registros de isópodes terrestres (Crustacea, Isopoda, Oniscidea) do Brasil. Uma grande coleção de isópodes terrestres de diferentes regiões brasileiras foi examinada. Duas novas espécies de *Amazoniscus* Lemos de Castro, 1967 (Scleropactidae) são descritas: *A. zimmeri* Campos-Filho, Montesanto & Araujo sp. proveniente do Estado do Pará e *A. schmidtii* Campos-Filho, Montesanto & Taiti sp. nov. o Estado de Minas Gerais. *Pseudotyphloscia alba* (Dollfus, 1898) (Philosciidae) tem o seu primeiro registro para o Brasil. A posição sistemática de *Venezillo tuberosus* (Budde-Lund, 1904) é discutida e transferida para *Ctenorillo* Verhoeff, 1942. *Androdeloscia lejeunei* (Lemos de Castro & Souza, 1986) e *Diploexochus echinatus* Brandt, 1833 do Estado do Pará, são redescritas.

PALAVRAS-CHAVE. Neotrópico, Floresta Tropical Amazônica, Mata Atlântica.

To date, ca. 170 species of terrestrial isopods (Oniscidea), distributed in 54 genera and 20 families, are known from Brazil (SOUZA-KURY, 1998; SCHMALFUSS, 2003; ARAUJO & QUADROS, 2005; SOUZA *et al.*, 2006, 2010, 2011, 2015; ARAUJO & TAITI, 2007; SOKOŁOWICZ *et al.*, 2008; MAGRINI *et al.*, 2010; CAMPOS-FILHO & ARAUJO, 2011a,b; CAMPOS-FILHO *et al.*, 2012, 2013a,b, 2014, 2015a,b, 2016; LISBOA *et al.*, 2013; COSTA *et al.*, 2014; CARDOSO *et al.*, 2016).

Recently, many surveys have been conducted through several Brazilian regions, including cave environments, and many specimens have been collected. Some of these species are waiting for identification and/or formal descriptions, in case of new taxa (e.g. MAGRINI *et al.*, 2010; GALLÃO & BICHUETTE, 2015; SILVA & FERREIRA, 2015; FERNANDES *et al.*, 2016).

A large collection of terrestrial isopods from different Brazilian regions, including Atlantic forest and Amazon rainforest, have been examined and two new species belonging to the family Scleropactidae are recognized. In

addition, the examination of specimens of *Venezillo tuberosus* (Budde-Lund, 1904) from the state of Ceará, allowed us to allocate this species into the genus *Ctenorillo* Verhoeff, 1942. Also, *Androdeloscia lejeunei* (Lemos de Castro & Souza, 1986) and *Diploexochus echinatus* Brandt, 1833 from the state of Pará, are redescribed.

MATERIAL AND METHODS

Specimens were stored in 75% ethanol and identifications were based on morphological characters. The species were illustrated with the aid of a camera lucida mounted on Wild M5 and M20 microscopes. The final illustrations were prepared as in MONTESANTO (2015, 2016). The SEM micrographs were taken at Centro de Microscopia Eletrônica (UFRGS) using a JSM 6060 Scanning Electron Microscope. The coordinates of the *noduli laterales* were obtained and figured as in VANDEL (1962). The respiratory structures were classified as in FERRARA *et al.* (1994) and PAOLI *et al.* (2002).

The material examined is deposited in the Natural History Museum, Section Zoology 'La Specola', Florence, Italy (MZUF); in the Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil (MZUSP); and in the Coleção de Crustáceos do Departamento de Zoologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil (UFRGS).

Abbreviations: APA, Área de Proteção Ambiental (Area of Environmental Protection); CEPLAC, Comissão Executiva de Planejamento de Lavoura Cacaueira (Executive Committee of Cocoa Farming Planning); EE, Estação Ecológica (Ecological Station); FLONA, Floresta Nacional (National Forest); FZBRs: Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, Brazil; ICZN, International Code of Zoological Nomenclature; MNRJ, Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil; MPEG, Museu Paraense Emílio Goeldi, Belém, Brazil; UESC, Universidade Estadual de Santa Cruz, Ilhéus, Bahia, Brazil; UFSM, Universidade Federal de Santa Maria, Santa Maria, Brazil; PARNA, Parque Nacional (National Park); PARNAT, Parque Natural (Natural Park); PE: Parque Estadual (State Park); REBIO, Reserva Biológica (Biological Reserve); RPPN, Reserva Particular do Patrimônio Natural (Private Natural Heritage Reserve).

RESULTS

Trichoniscidae

Miktoniscus Kesselyák, 1930

Miktoniscus medcofi (Van Name, 1940)

Trichoniscus (*Miktoniscus*) *medcofi* VAN NAME, 1940: 111, fig. 2.

Trichoniscus (*Miktoniscus*) *humus*; MULAİK & MULAİK, 1942:5, pl. 5, pl. 4, figs 42-52; VAN NAME, 1942:302, fig. 3; SCHULTZ, 1962:47; VANDEL, 1965:375.

Trichoniscus veracruzensis MULAİK, 1960:128, pl. 4, figs 65-70, pl. 5, figs 71-73.

Miktoniscus medcofi; MUCHMORE, 1957:79; LEMOS DE CASTRO, 1953:529, fig. 1; 1971:10, fig. 3; VANDEL, 1960:349; SCHULTZ, 1962:47, 1976:36, figs 40-45; SOUZA-KURY, 1998:668; ARAUJO & BUENO, 1998:186; LEISTIKOW & WÄGELE, 1999:7; SCHMALFUSS, 2003:166; CAMPOS-FILHO *et al.*, 2014:363, figs 1-4, 2015b:117.

Miktoniscus alabamensis MUCHMORE, 1964:56; VANDEL, 1965:379, figs 12, 14a-b, 17a-b, 18a-c, 19a-d, 20; PECK, 1970:203.

Miktoniscus ohioensis Muchmore, 1964:51, figs 1-5; Vandel, 1965:373. nec *Miktoniscus medcofi*; VANDEL, 1965:375, figs 13a-b, 14a-b.

Material examined. BRAZIL, **Pará**: ♂, Belém (Campus MPEG), 01°27'09"S, 48°28'35"W, 19.IX.2014, J. T. Lisboa col. (UFRGS 6009).

Previous Brazilian records. Amapá: Serra do Navio (LEMONS DE CASTRO, 1971). Pará: Park of MPEG (LEMONS DE CASTRO, 1971); Canaã dos Carajás (CAMPOS-FILHO *et al.*, 2014). Rio de Janeiro: Furnas de Tijuca, Tijuca and Três Rios Road (Freguezia) (LEMONS DE CASTRO, 1953); Ilha de Paquetá, Jacarepaguá and Tijuca (LEMONS DE CASTRO, 1971). São Paulo: Itanhaém, S. Vicente, Santos and São Paulo (LEMONS DE CASTRO, 1971). Paraná: Água Boa cave, Almirante Tramandaré (CAMPOS-FILHO *et al.*, 2015b). Rio Grande do Sul: Porto Alegre (Morro Santana) (ARAUJO & BUENO, 1998).

Distribution. Southern and central USA, Mexico and Brazil where it is probably introduced (CAMPOS-FILHO *et al.*, 2014).

Styloniscidae

Styloniscus Dana, 1852

Styloniscus spinosus (Patience, 1907)

(Figs 1-5)

Trichoniscus spinosus PATIENCE, 1907:85, pl. III.

Cordioniscus spinosus: VANDEL, 1933:44.

Styloniscus spinosus; VANDEL, 1952:52, figs 45-47; BARNARD, 1958: 74; ARCANGELI, 1961:344; STROUHAL, 1961:194; BARNARD, 1964:51; FERRARA & TAITI, 1979:99; TAITI & FERRARA, 1983:200; HARDING & SUTTON, 1985:15; TAITI & HOWARTH, 1996:60; MAGRINI *et al.*, 2010: 216, 2011: 65.

Material examined. BRAZIL, **Paraná**: 5♀, Matinhos, São João da Graciosa, Serra da Graciosa, Graciosa road, 25°21'35"S 48°53'01"W, 10.VIII.2012, P. B. Araujo & B. L. Zimmermann col., not impacted area (UFRGS 5561); 13♂, 6♀, Matinhos, PARNAT Saint-Hilaire Lang, PR 508 road, 25°38'39"S 48°36'04"W, 10.VIII.2012, P. B. Araujo & B. L. Zimmermann col., not impacted area, in leaf litter, in woods (UFRGS 5559). **Santa Catarina**: 5♂, 5♀, Rancho Queimado, Bauer Hotel, 27°40'57"S 49°02'41"W, 25.VI.2012, impacted area, in woods and kitchen garden (UFRGS 5570).

Previous Brazilian records. São Paulo: Núcleo Santa Virginia, Parque das Neblinas and REBIO Paranapiacaba (MAGRINI *et al.*, 2010).

Distribution. Mauritius, Réunion, Madagascar, Hawaii, Brazil (São Paulo, Santa Catarina and Paraná) and greenhouses in Great Britain.

Philosciidae

Androdeloscia Leistikow, 1999

Remarks. To date, *Androdeloscia* includes 25 Neotropical species recorded from Bolivia, Brazil (Amazonian region), Colombia, Guatemala, Mexico, Peru and Venezuela (SCHMALFUSS, 2003; SCHMIDT & LEISTIKOW, 2005; GRANGEIRO & SOUZA, 2006; GRANGEIRO & CHRISTOFFERSEN, 2010; LÓPEZ-OROSCO *et al.*, 2016). The genus is mainly defined by the reduced body length, antennula with many aesthetascs inserted in one lateral set plus apical pair, antennal flagellum of three articles with apical organ as long as distal article of flagellum, *noduli laterales* with d/c coordinates showing a peak on pereonite 4, male pleopod 1 exopod rounded and endopod stout bearing a complex distal structure, male pleopod 2 endopod extremely elongated, and male pleopod 5 exopod grooved on medial margin with pectinate scales to accommodate pleopod 2 endopod (LEISTIKOW, 1999, 2001; SCHMIDT & LEISTIKOW, 2005).

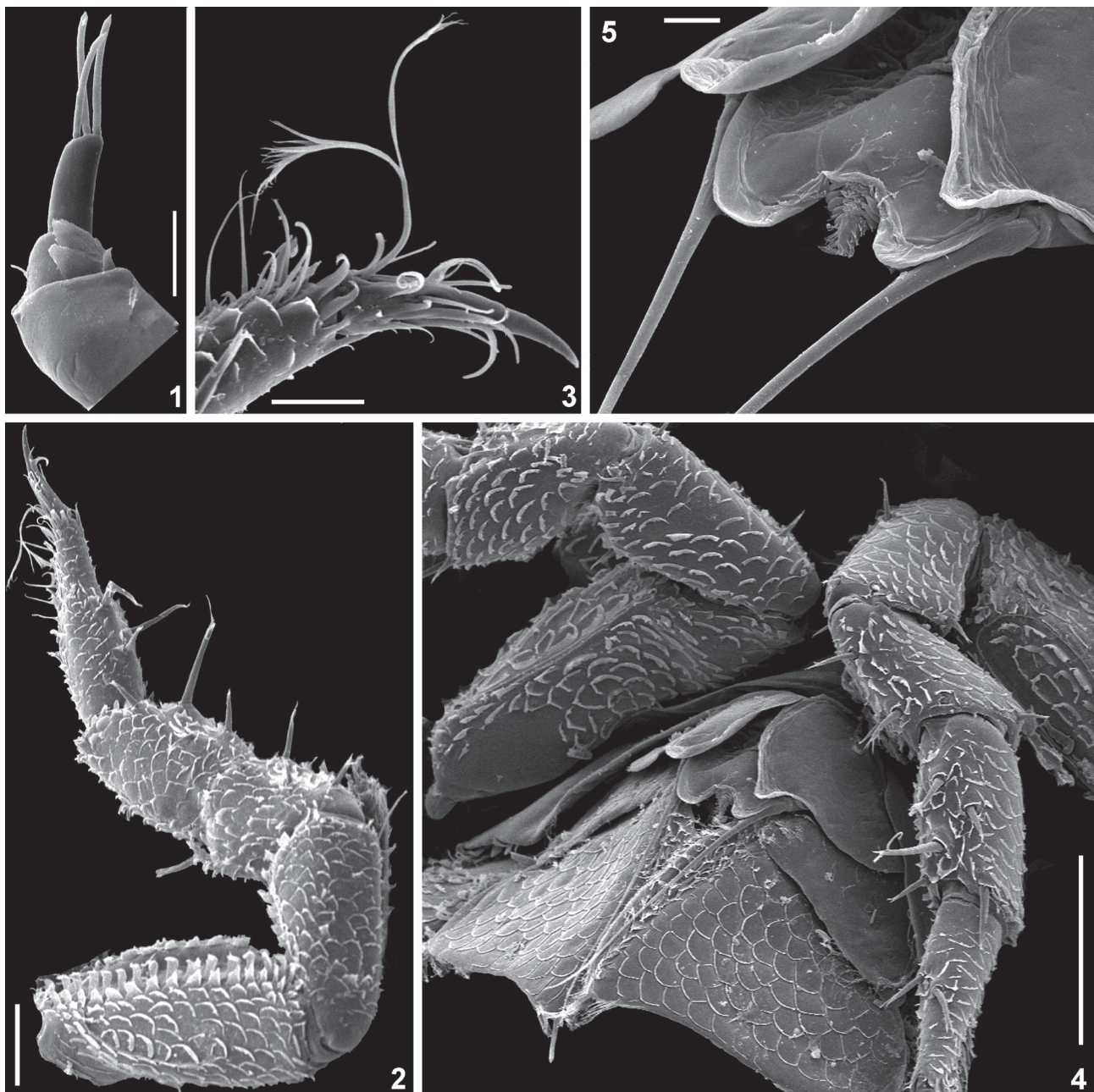
Androdeloscia lejeunei

(Lemos de Castro & Souza, 1986)

(Figs 6-27)

Prosekia lejeunei LEMOS DE CASTRO & SOUZA, 1986:432, figs 13-26; SOUZA-KURY, 1998:662; LEISTIKOW & WÄGELE, 1999:22; SCHMALFUSS, 2003:216.

Androdeloscia lejeunei; LEISTIKOW, 2001:6.



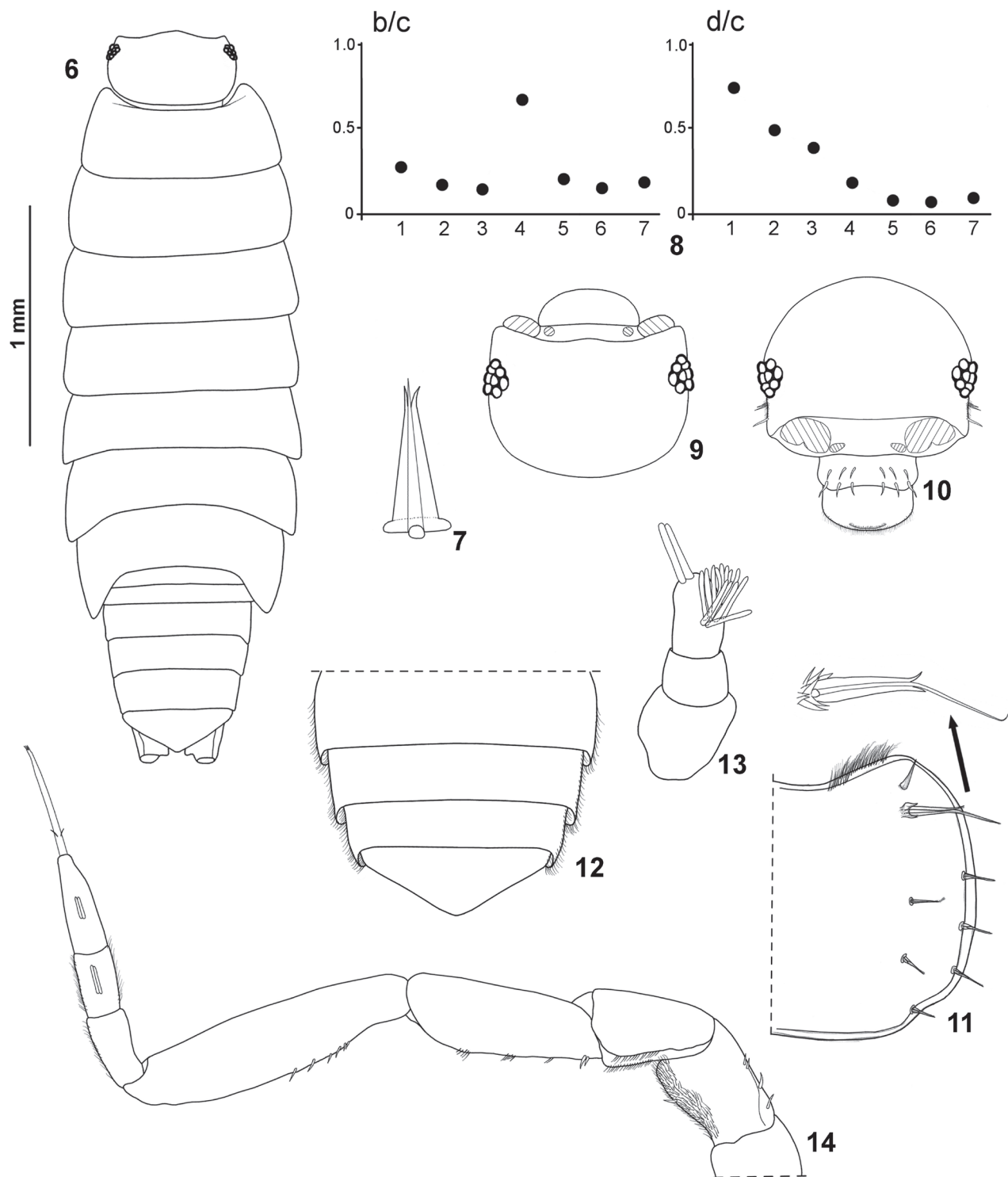
Figs 1-5. *Styloniscus spinosus* (Patience, 1907), ♂: 1, antennula; 2, pereopod 7; 3, pereopod 7 dactylus; 4, pleopods 1-3; 5, genital papilla, distal portion. Scale bars: 1, 3: 20 µm; 2: 50 µm; 4: 100 µm; 5: 10 µm.

Material examined. BRAZIL, **Pará:** 2♂, 2♀, Belém, Campus MPEG, 30.IV.2014, J. T. Lisboa col. (MZUF 9645); many ♂ and ♀, Belém, Campus MPEG, 19.IX.2014, J. T. Lisboa col. (MZUF 9646).

Previous Brazilian records. Pará: Belém, Park of MPEG (LEMONS DE CASTRO & SOUZA, 1986).

Redescription. Maximum body length: ♂ 2.5 mm; ♀ 3.5 mm. Color light brown; pereon with unpigmented spots on paramedian region, epimera more pigmented; pleon pigmented with some unpigmented spots on pleonites 1-3. Body elongated (Fig. 6), pereonites 1-4 with posterior corners right-angled and posterior margins straight, 5-7 gradually more acute and concave; pleon narrower than pereon with

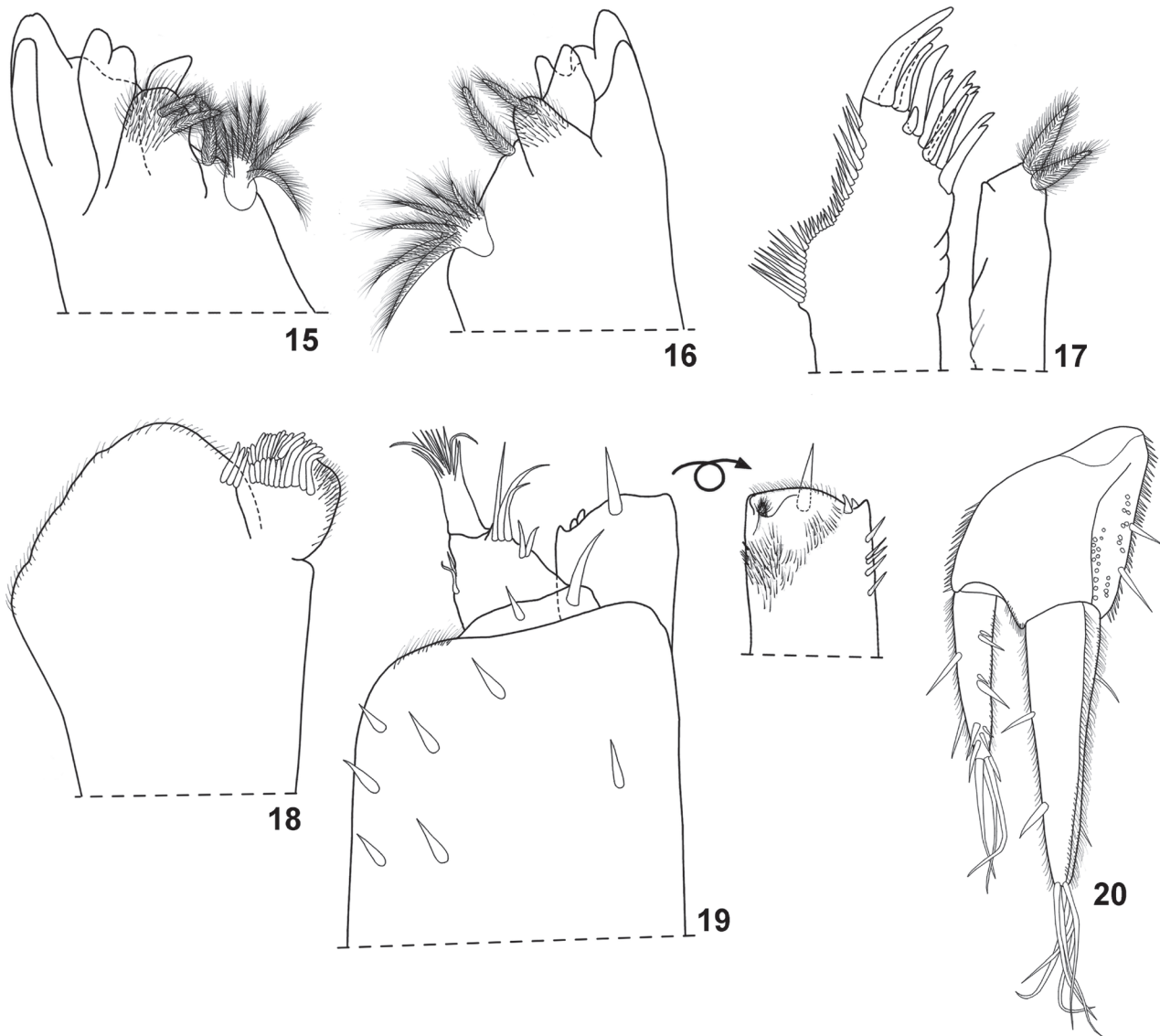
epimera reduced (Fig. 12); dorsum covered with triangular scale-setae (Fig. 7). *Noduli laterales* very long (Fig. 11), b/c and d/c coordinates as in Fig. 8. Cephalon (Figs 9, 10) with lateral lobes slightly developed, without frontal line, suprantennal line almost straight; eyes with eight ommatidia. Telson (Fig. 12) triangular, lateral sides almost straight, apex obtuse. Antennula (Fig. 13) of three articles, distal article slightly longer than wide, one set of many aesthetascs inserted subapically plus apical pair. Antenna (Fig. 14) with flagellum of three articles subequal in length, medial and distal articles bearing lateral aesthetascs; apical organ as long as distal flagellar article with two small free sensilla. Mandible (Figs 15, 16) with molar penicil dichotomized,



Figs 6-14. *Androdeloscia lejeunei* (Lemos de Castro & Souza, 1986), ♂: 6, adult specimen, dorsal view; 7, dorsal scale-seta; 8, b/c and d/c coordinates of *noduli laterales*; cephalon: 9, dorsal view; 10, frontal view; 11, right epimeron of pereonite 1; 12, pleonites 3-5 and telson; 13, antenna; 14, antenna.

consisting of six or seven setae, left mandible with 2+1 penicils, right with 1+1. Maxillula (Fig. 17) inner endite with two long penicils; outer endite with 4+6 teeth (four apically cleft) plus accessory tooth. Maxilla (Fig. 18) outer lobe about twice as wide as inner lobe. Maxilliped (Fig. 19) endite with two triangular setae on distal margin, and short

penicil near medial corner. Pereopod 1 carpus with antennal grooming brush slightly transverse, distal seta with double-serrate apex; carpus 1-7 with distal fringe of scales. Pleopod exopods without respiratory areas. Uropod (Fig. 20) grooved on outer margin bearing glandular pores, exopod longer than endopod, endopod inserted proximally.



Figs 15-20. *Androdeloscia lejeunei* (Lemos de Castro & Souza, 1986), ♂: 15, left mandible; 16, right mandible; 17, maxillula; 18, maxilla; 19, maxilliped; 20, uropod.

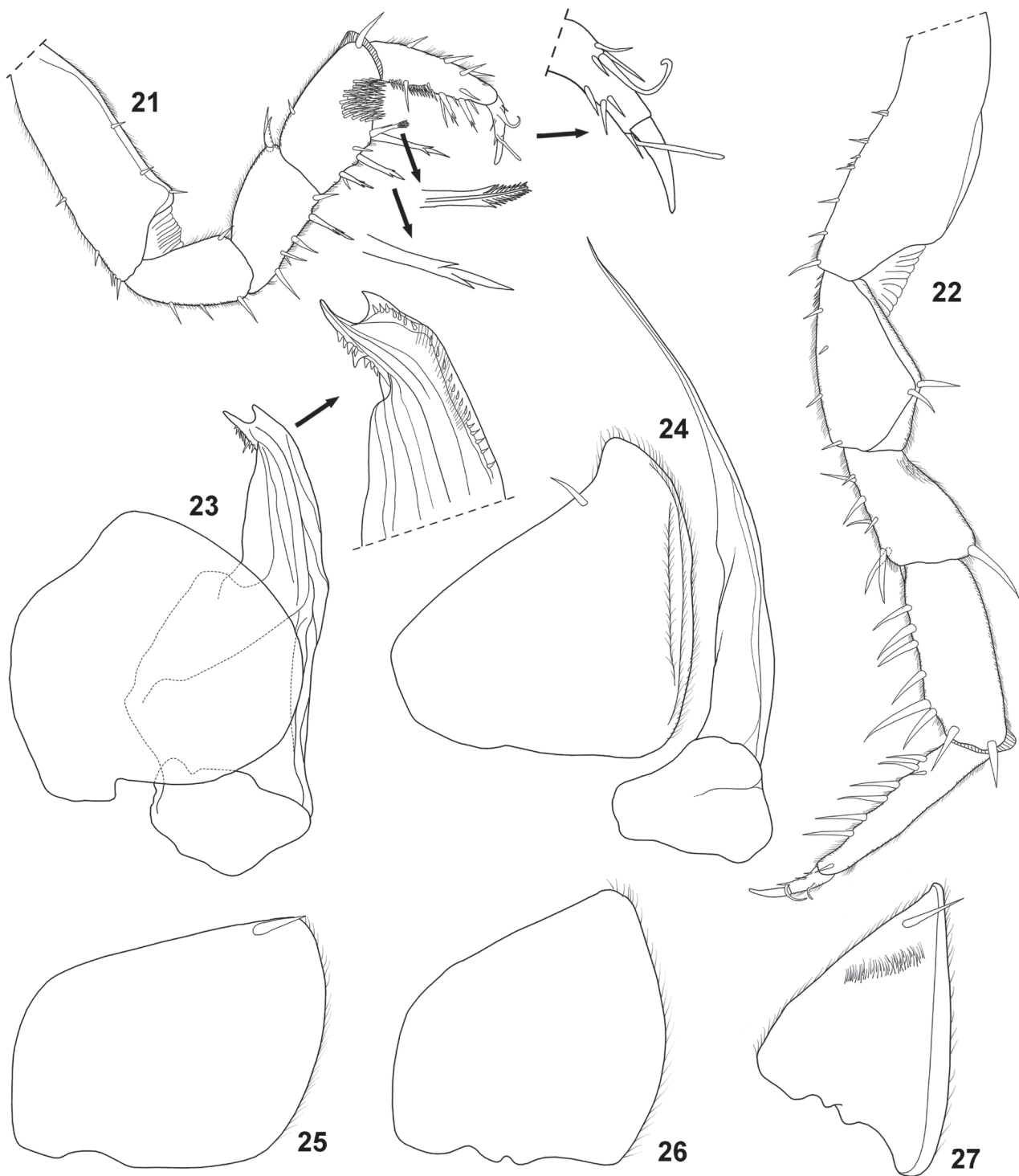
Male: pereopods with no sexual modifications (Figs 21, 22). Pleopod 1 (Fig. 23) exopod rounded with outer distal margin slightly concave; endopod with distal part bent outwards with two apical points, inner margin bearing small setae, outer margin bearing strong and short setae. Pleopod 2 (Fig. 24) exopod triangular, outer margin almost straight bearing one subapical seta, distal part slightly bent outwards; endopod flagelliform, about twice as long as exopod. Pleopod 3 and 4 exopods as in Figs 25, 26. Pleopod 5 exopod (Fig. 27) triangular, outer margin with subapical seta.

Remarks. *Androdeloscia lejeunei* is easily distinguished from their congeners by the shape of the male pleopod 1 endopod with a double pointed apex.

Distribution. *Androdeloscia lejeunei* is recorded from the states of Pará and Tocantins, Brazil.

Atlantoscia Ferrara & Taiti, 1981
***Atlantoscia floridana* (Van Name, 1940)**

- Philoscia floridana* VAN NAME, 1940:113, fig. 4.
Philoscia sp.; SCHULTZ, 1961:170, 1963:439; DUFFEY, 1964:249.
Chaetophiloscia paulensis; VANDEL, 1963:74, figs 7, 8, 1968:68, 1977:388; LEMOS DE CASTRO, 1971:11.
Philoscia bonita; SCHULTZ, 1964:156, figs 1–27.
Atlantoscia alceui; FERRARA & TAITI, 1981:190, figs 1–4; LEMOS DE CASTRO, 1985:418, figs 1–16.
Ocelloscia floridana; SCHULTZ & JOHNSON, 1984:161, figs 4, 5 and 11; JOHNSON, 1986:123, figs 2 and 3.
Atlantoscia floridana; TAITI & FERRARA, 1991:902, figs 1–15; ARAUJO *et al.*, 1996:115, figs 11–14 and 64; SOUZA-KURY, 1998:658; LEISTIKOW & WÄGELE, 1999:13; ARAUJO & LEISTIKOW, 1999:117, figs 6–10; LEISTIKOW, 2001:6; LEISTIKOW & ARAUJO, 2001:330, fig. 1, plate 1a,b; SCHMALFUSS, 2003:49; ARAUJO & BOND-BUCKUP, 2004:1, figs 2–6, tables 1–3; ARAUJO *et al.*, 2004a:952, figs 1–46, tables 1 and 2,



Figs 21-27. *Androdeloscia lejeunei* (Lemos de Castro & Souza, 1986), ♂: 21, pereopod 1; 22, pereopod 7; 23, pleopod 1; 24, pleopod 2; 25, pleopod 3 exopod; 26, pleopod 4 exopod; 27, pleopod 5 exopod.

2004b:222, figs 2-30, tables 1-3; ARAUJO & BOND-BUCKUP, 2005:290, figs 3-11, tables 1-5; LOPES *et al.*, 2005:101, table 1; ALMERÃO *et al.*, 2006:474, fig. 4; QUADROS & ARAUJO, 2007:242, figs 1-3, tables 1, 2; 2008:59, figs 1, 2, tables 1-5; QUADROS *et al.*, 2009:244, figs 1, 3, tables 1, 2; QUADROS, 2010:573, fig. 1; ZIMMERMANN *et al.*, 2012:712, fig. 1, table 1; 2015a:702, figs 5, 6, tables 1-3; 2015b:3, fig. 2, tables 1, 2; CAMPOS-FILHO *et al.*, 2013a:464, fig. 12a; WOOD *et al.*, 2017:4, figs 4-7. nec *Philoscia paulensis*; MOREIRA, 1927:194, figs 1-3; MOREIRA, 1931:426, fig. 1; LEMOS DE CASTRO, 1958a:7; LEMOS DE CASTRO, 1976:391.

Material examined. BRAZIL, **Bahia**: ♂, Barra do Jacuípe, 15.IX.2013, I. S. Campos-Filho & P. B. Araujo col. (UFRGS 5833); 2♂, 3♀, Mata de São João, near to Police station, 15.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5837); 4♂, 4♀, Ilhéus, Campus UESC, 14°47'56"S, 39°10'20"W, 09.VII.2012, J. T. Lisboa col., in woods, near of bus stop (UFRGS 5694); 2♀, Ilhéus,

Campus UESC, 30.VII.2012, J. T. Lisboa col., in *Theobroma cacao*, in Bryophytes (UFRGS 5705); many ♂ and ♀, Itapé, 14°55'08"S, 39°27'43"W, 17.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5829); many ♂ and ♀, Itajú-Itapé, 15°01'58"S, 39°36'15"W, 17.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5828). **Espírito Santo:** many ♂ and ♀, São Mateus, 18°44'53"S, 39°51'53"W, 11.III.2014, G. M. Cardoso col. (UFRGS 5899); many ♂ and ♀, Linhares, 19°25'45"S, 40°05'12"W, 11.III.2014, G. M. Cardoso col. (UFRGS 5902); ♂, 3♀, Santa Tereza, 19°56'29"S, 40°34'56"W, 12.III.2014, G. M. Cardoso col. (UFRGS 5903); ♂, Santa Tereza, 19°56'29"S, 40°34'56"W, 12.III.2014, G. M. Cardoso col. (UFRGS 5913); many ♂ and ♀, Cariacica, 20°14'29"S, 40°25'02"W, 13.III.2014, G. M. Cardoso col. (UFRGS 5901); ♂, Domingos Martins, 20°22'32"S, 40°35'33"W, 13.III.2014, G. M. Cardoso col. (UFRGS 5918). **Minas Gerais:** 2♂, 5♀, Haras Pousada Raiz Mineira, 12.VI.2013, I. S. Campos-Filho & G. M. Cardoso col. (UFRGS 5709); ♂, ♀, Areado, 21°25'13"S, 46°09'43"W, 11.VI.2013, I. S. Campos-Filho & G. M. Cardoso col., in coffee monoculture, near of Furnas dike (UFRGS 5706); 3♂, 6♀, 1 manca, Campanha, 21°49'52"S, 45°35'32"W, 07.VI.2013, at 932 meters, I. S. Campos-Filho & G. M. Cardoso col., in bromeliads (UFRGS 5608); ♀, Heliodora, 21°52'52"S, 45°33'10"W, 07.VI.2013, I. S. Campos-Filho & G. M. Cardoso col. (UFRGS 5681); many ♂ and ♀, Heliodora, 07.VI.2013, I. S. Campos-Filho & G. M. Cardoso col. (UFRGS 5742); ♀, Pedralva, 22°12'03"S, 45°25'17"W, 07.VI.2013, I. S. Campos-Filho & G. M. Cardoso col. (UFRGS 5682); ♀, Itamonte, 22°20'44"S, 44°48'52"W, 07.III.2014, G. M. Cardoso col. (UFRGS 5906). **Rio de Janeiro:** ♂, 4♀, PARNA Itatiaia, 22°27'45"S, 44°35'32"W, at 568 meters, 09.VI.2013, I. S. Campos-Filho & G. M. Cardoso col., in woods (UFRGS 5698); many ♂ and ♀, Buzios, Praia João Fernandez, 22°44'21"S, 41°52'29"W, 08.III.2014, G. M. Cardoso col. (UFRGS 5895); 5♂, 3♀, Buzios, Praia da Tartaruga, 22°45'20"S, 41°54'05"W, 08.III.2013, G. M. Cardoso col. (UFRGS 5896); many ♂ and ♀, Buzios, Praia do Perú, 22°52'01"S, 41°59'06"W, 08.III.2013, G. M. Cardoso col. (UFRGS 5897); many ♂ and ♀, Cabo Frio, Praia das Conchas, 22°52'20"S, 41°58'59"W, 08.III.2013, G. M. Cardoso col. (UFRGS 5900); ♂, 7♀, PARNA Itatiaia, 22°45'43"S, 44°37'11"W, at 1158 meters, 09.VI.2013, I. S. Campos-Filho & G. M. Cardoso col., in Atlantic forest (UFRGS 5698); 3♀, Saquarema, 22°55'28"S, 42°26'24"W, 08.III.2014, G. M. Cardoso col. (UFRGS 5898). **São Paulo:** 3♂, 4♀, 1 juvenile, Mongaguá, 24°05'04"S, 46°36'37"W, 03.XII.2013, G. M. Cardoso col. (UFRGS 5954); ♂, ♀, Itariri, 24°18'21"S, 47°07'48"W, 03.XII.2013, I. S. Campos-Filho col. (UFRGS 5955); 5♂, 6♀, Iguape, 24°34'10"S, 47°32'55"W, 03.XII.2013, I. S. Campos-Filho col. (UFRGS 5960); ♂, ♀, 1 juvenile, Iguape, 24°42'48"S, 47°47'09"W, 02.XII.2013, I. S. Campos-Filho col. (UFRGS 5956); ♂, 2♀, 1 juvenile, Iguape, 24°45'48"S, 47°32'47"W, 03.XII.2013, I. S. Campos-Filho col. (UFRGS 5958); ♂, 2♀, 4 juveniles, Itapoá, 25°08'58"S, 48°38'20"W, 01.XII.2013, I. S. Campos-Filho col. (UFRGS 5961); 3♂,

4♀, 4 juveniles, Guaraqueçaba, 25°16'46"S, 48°43'41"W, 02.XII.2013, I. S. Campos-Filho col. (UFRGS 5952); 2♀, 3 juveniles, Guaraqueçaba, 02.XII.2013, I. S. Campos-Filho col. (UFRGS 5963); many ♂, ♀, Imbituba, Morro Mirim, 28°14'40"S, 48°41'53"W, 30.VI.2013, I. S. Campos-Filho col. (UFRGS 5953). **Mato Grosso do Sul:** 7♂, 6♀, Jardim, RPPN Rio da Prata, 21°27'41"S, 56°26'23"W, 13.XI.2014, G. M. Cardoso col. (UFRGS 6010). **Paraná:** 2♂, 2♀, 2 juveniles, Morretes, 25°22'S, 48°51'15"W, 02.XII.2013, I. S. Campos-Filho col. (UFRGS 5951); 2♀, Morretes, 25°26'46"S, 48°46'05"W, 10.VIII.012, P. B. Araujo & B. L. Zimmermann col., in bulding, near to the road (UFRGS 5536); many ♂ and ♀, Morretes, 25°31'35"S, 48°47'16"W, 01.XII.2013, I. S. Campos-Filho col. (UFRGS 5959); ♂, 2♀, Matinhos, PARNAT Saint-Hilaire, PR 508 road, 25°38'39"S, 48°36'04"W, 10.VIII.2012, P. B. Araujo & B. L. Zimmermann col., in leaf litter and woods (UFRGS 5558); 6♂, 10♀, 1 juvenile, Matinhos, 25°42'21"S, 48°34'19"W, 01.XII.2013, I. S. Campos-Filho col. (UFRGS 5957); ♂, Lapa, PE do Monge, 25°46'55"S, 49°41'49"W, 11.VIII.2012, P. B. Araujo & B. L. Zimmermann col., area with restaurants, in woods (UFRGS 5555); 3♂, Lapa, PE do Monge, 11.VIII.2012, P. B. Araujo & B. L. Zimmermann col. (UFRGS 5619); ♀, Curitiba, 26°26'S 49°14'W, 13.VIII.2012, P. B. Araujo & B. L. Zimmermann col. (UFRGS 5558). **Santa Catarina:** 9♂, 5♀, Joinville, 26°17'31"S, 48°53'42"W, 01.XII.2013, I. S. Campos-Filho col. (UFRGS 5962); 6♂, 5♀, Corupá, 26°25'23"S, 49°14'46"W, 27.VI.2012, P. B. Araujo & B. L. Zimmermann col., under Palm tree leaves (UFRGS 5366); 5♀, Blumenau, Parque das Nascentes, 27°03'27"S, 49°05'10"W, 27.VI.2012, P. B. Araujo & B. L. Zimmermann col., open vegetation cover, in bromeliads (UFRGS 5588); 9♂, 11♀, Blumenau, Parque das Nascentes, 27.VI.2012, P. B. Araujo & B. L. Zimmermann col. (UFRGS 5618); ♀, Rancho Queimado, Bauer Hotel, 27°40'57"S, 49°02'41"W, 25.VI.2012, P. B. Araujo & B. L. Zimmermann col., site with many roots, in bromeliads (UFRGS 5574); ♂, ♀, Rancho Queimado, Bauer Hotel, 25.VI.2012, P. B. Araujo & B. L. Zimmermann col. (UFRGS 5616); ♂, ♀, Santa Rosa de Lima, 27°59'17"S, 49°06'45"W, 25.VI.2012, P. B. Araujo & B. L. Zimmermann col., near of pasture, in woods, dense vegetation cover, many roots (UFRGS 5579); 2♀, Santa Rosa de Lima, 27°59'33"S, 49°06'48"W, 25.VI.2012, P. B. Araujo & B. L. Zimmermann col. (UFRGS 5613); 2♂, 2♀, Santa Rosa de Lima, 25.VI.2012, P. B. Araujo & B. L. Zimmermann col. (UFRGS 5679); 2♂, 3♀, Orleans, Real Nob Hotel, 28°21'17"S, 49°16'29"W, 24.VI.2012, P. B. Araujo & B. L. Zimmermann col., litter with many roots, in bromeliads (UFRGS 5563). **Rio Grande do Sul:** many ♂ and ♀, Rio da Várzea, abandoned house, 26.VII.2013, G. M. Cardoso col. (UFRGS 5733).

Previous Brazilian records. Pará: Park of MPEG (LEMONS DE CASTRO, 1985). Rio Grande do Norte: Macaíba (LEMONS DE CASTRO, 1985). Paraíba: João Pessoa (LEMONS DE CASTRO, 1985). Pernambuco: Moreno (LEMONS DE CASTRO, 1985). Sergipe: Santo Amaro das Brotas (CAMPOS-FILHO *et al.*, 2013a). Bahia: Abrolhos Archipelagous and Salvador

(LEMONS DE CASTRO, 1985); REBIO de Una (CAMPOS-FILHO *et al.*, 2013a). Minas Gerais: Lagoa Santa and Leopoldina (LEMONS DE CASTRO, 1985); Barão de Cocais, Lagoa Santa, Manhuaçu and Santana do Riacho (CAMPOS-FILHO *et al.*, 2013a); Varginha (ZIMMERMANN *et al.*, 2015b). Espírito Santo: Santa Cruz and Santa Tereza (LEMONS DE CASTRO, 1985); Guarapari (PE Paulo César Vinha), Ibitirama, Meaípe and Santa Leopoldina (CAMPOS-FILHO *et al.*, 2013a). Rio de Janeiro: Restinga de Jacarepaguá and Petrópolis (VANDEL, 1963); Maringá, Ilha de Itacuruçá, PARNA Serra dos Órgãos, Planalto do Itatiaia and REBIO de Jacarepaguá (LEMONS DE CASTRO, 1985). São Paulo: Barueri, Jacareí and Ubatuba (LEMONS DE CASTRO, 1985); Campinas (PE Emílio José Salim), Iguape, Ilha do Cardoso, Microbacia do Rio Quilombo, Miracatu, Peruibe (EE Juréia Itatins), PE Cantareira, PE Jacupiranga and São Paulo (CAMPOS-FILHO *et al.*, 2013a). Paraná: Paranaguá (LEMONS DE CASTRO, 1985); Curitiba, Morretes (PE Pau Oco) and Toledo (CAMPOS-FILHO *et al.*, 2013a); Curitiba and Foz do Iguaçu (ZIMMERMANN *et al.*, 2015b). Santa Catarina: Florianópolis, Itajaí and Seara (CAMPOS-FILHO *et al.*, 2013a); Blumenau, Corupá, Orleans, Rio Fortuna and São João Batista (ZIMMERMANN *et al.*, 2015b). Rio Grande do Sul: Guaíba (LEMONS DE CASTRO, 1985); REBIO Lami, Porto Alegre (ARAUJO & BOND, 2004); Barra do Ouro and Rincão dos Kroeff (LOPES *et al.*, 2005); PE Itapuá, Porto Alegre (ALMERÃO *et al.*, 2006; QUADROS & ARAUJO, 2007, 2008; QUADROS *et al.*, 2009); Morro Santana and Belém Novo, Porto Alegre (ZIMMERMANN *et al.*, 2012, 2015a); Arroio do Sal, Arroio Teixeira, Barra do Ouro, Dom Pedro de Alcântara, Itapeva (Torres), Maquiné, Morrinhos do Sul, Morro Azul, Porto Alegre (REBIO Lami), Rincão dos Kroeff, Rondinha, São Francisco de Paula, Terra de Areia and Três Passos (CAMPOS-FILHO *et al.*, 2013a); Arroio do Sal, Barra do Ribeiro, Mariana Pimentel, Mostardas and Torres (ZIMMERMANN *et al.*, 2015b).

Distribution. Coastal regions of Florida, Brazil, Argentina, Ascension and St. Helena Island (Schmalfuss 2003).

***Atlantoscia ituberasensis* Campos-Filho, Lisboa & Araujo, 2013**

Atlantoscia ituberasensis CAMPOS-FILHO *et al.*, 2013a:466, figs 1-5, 12c; ZIMMERMANN *et al.*, 2015a:702, figs 5, 6, tables 1-3.

Material examined. BRAZIL, **Bahia**: ♀, Camacã, BR-101 road, 15°28'01"S, 39°26'33"W, 20.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5834).

Previous Brazilian records. Bahia: Ituberá (CAMPOS-FILHO *et al.*, 2013a); Ituberá and Santa Cruz da Vitória (ZIMMERMANN *et al.*, 2015a).

Distribution. This species is recorded only from the state of Bahia, Brazil.

***Atlantoscia rubromarginata* Araujo & Leistikow, 1999**

Atlantoscia rubromarginata ARAUJO & LEISTIKOW, 1999:110, figs 1-5; LEISTIKOW, 2001:6; SCHMALFUSS, 2003:49; CAMPOS-FILHO *et al.*,

2013a:466, fig. 12b; LISBOA *et al.*, 2013:394, fig. 1b; ZIMMERMANN *et al.*, 2015a:702, figs 5, 6, tables 1-3; 2015b:3, table 1.

Material examined. BRAZIL, **Pará**: many ♂ and ♀, Belém, Campus MPEG, 01°27'09"S, 48°28'35"W, 19.IX.2014, J. T. Lisboa col. (UFRGS 6007). **Bahia**: 3♀, Travessão, APA Camamu, 14°08'31"S, 39°17'29"W, 18.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5830); ♂, Marauvis, 14°10'02"S, 39°05'37"W, 18.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5826); ♂, ♀, Itabuna, BR-101 road, 14°52'52"S, 39°16'57"W, 20.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5836); many ♂ and ♀, Una, Ilha do Desejo, 15°05'02"S, 38°59'57"W, 19.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5838); ♂, ♀, São José da Vitória, 15°07'23"S, 39°22'29"W, 20.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5832); ♂, ♀, Una, REBIO Una, 15°10'08"S, 39°00'03"W, 19.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5835); ♂, Canavieiras, 15°29'01"S, 38°59'48"W, 19.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5831).

Previous Brazilian records. Alagoas: REBIO Pedra Talhada, Quebrangulo (CAMPOS-FILHO *et al.*, 2013a). Sergipe: Areia Branca (PARNA Serra Itabaiana) and Santa Luzia do Itanhy (CAMPOS-FILHO *et al.*, 2013a). Bahia: Camacan (RPPN Serra Bonita), Canavieiras, Ibicaí, Ilhéus (CEPLAC), Ituberá, Porto Seguro (PARNA Pau Brasil), Salvador and Una (CAMPOS-FILHO *et al.*, 2013a); Ilhéus and Santa Cruz da Vitória (ZIMMERMANN *et al.*, 2015a, 2015b).

Distribution. States of Alagoas, Sergipe, Pará and Bahia, northeastern Brazil.

Benthana Budde-Lund, 1908
***Benthana longipenis* Lemos de Castro, 1958**

Benthana longipenis LEMONS DE CASTRO, 1958b:109, figs 69-77; SOUZA-KURY, 1998:659; LEISTIKOW & WÄGELE, 1999:14; SCHMALFUSS, 2003:53; CAMPOS-FILHO *et al.*, 2015a:32, figs 19, 20, 25b.

Material examined. BRAZIL, **Minas Gerais**: many ♂ and ♀, Eloi Mendes, G. M. Cardoso col. (MZUF 9647).

Previous Brazilian records. São Paulo: Lageado, Serra da Bocaina (LEMONS DE CASTRO, 1958b). Minas Gerais: Caeté (Gruta AP-65 cave), Itamonte, Liberdade, Lima Duarte (PE do Ibitipoca) (CAMPOS-FILHO *et al.*, 2015a). Rio de Janeiro: Petrópolis and Planalto do Itatiaia (Aguilhas Negras, Macieiras, Pedra da Tartaruga, Repouso Itatiaia) (CAMPOS-FILHO *et al.*, 2015a). São Paulo: Lajeado (Serra da Bocaina), São Bento do Sapucaí, São José do Barreiro (PARNA Serra da Bocaina), and Wenceslau Braz (CAMPOS-FILHO *et al.*, 2015a). Rio Grande do Sul: Erechim (CAMPOS-FILHO *et al.*, 2015a).

Distribution. States of Minas Gerais, Rio de Janeiro, São Paulo and Rio Grande do Sul, Brazil.

***Benthana tupinamba* Campos-Filho, Taiti & Araujo, 2015**

Benthana tupinamba CAMPOS-FILHO *et al.*, 2015a:61, figs 39, 40, 43.

Material examined. BRAZIL, **Bahia**: 7♂, 2♀, Ilhéus, UESC, 14°47'45"S, 39°10'14"W, 25.VII.2013, J. T. Lisboa col. (MZUF 9648).

Previous Brazilian records. Bahia: Ilhéus (CAMPOS-FILHO *et al.*, 2015a)

Distribution. This species is known only from the type locality: Ilhéus, Bahia, Brazil.

Pseudotyphloscia Verhoeff, 1928
***Pseudotyphloscia alba* (Dollfus, 1898)**

Philoscia alba DOLLFUS, 1898:381, figs 29a-b, pl. 15, fig. 29; HEROLD, 1931:308.

Pseudotyphloscia pallida VERHOEFF, 1928:223, figs 26-30.

Pseudotyphloscia alba: GREEN *et al.*, 1990:420, figs 2, 3; TAITI *et al.*, 1992:790; KWON & TAITI, 1993:14; Gregory, 2014:7, fig. 2.

Material examined. BRAZIL, **Paraná**: many ♂ and ♀, Antonina, near of Nunes river, road to Guaraqueçaba, 25°20'48"S, 48°46'05"W, camping area, 10.VIII.2012, P. B. Araujo & B. L. Zimmermann col. (MZUSP 35108); 3♂, 3♀, same data as previous (MZUF 9644). **Minas Gerais**: many ♂ and ♀, Heliadora, 21°52'52"S 45°33'10"W, 07.VI.2013, G. M. Cardoso & I. S. Campos-Filho col. (MZUSP 35109); 3♂, 3♀, same data as previous (MZUF 9643).

Remarks. *Pseudotyphloscia* was proposed by VERHOEFF (1928) to include *P. pallida* from Formosa. GREEN *et al.* (1990) redefined the genus based on the type material of *P. pallida* and specimens from West Java and Krakatau Islands. The authors concluded that *P. pallida* is a junior synonym of *Philoscia alba* Dollfus, 1898 from Celebes described by DOLFUSS (1898) and transferred the species to *Pseudotyphloscia*. To date, *Pseudotyphloscia* includes only *P. alba*. The specimens from Brazil here examined indeed correspond to the description provided by GREEN *et al.* (1990).

Distribution. Brazil, Southern China, glasshouses in England, Indonesia (Sulawesi, Java, Krakatau Is, Bali), Philippines, and Taiwan (KWON & TAITI, 1993; GREGORY, 2014).

Balloniscidae

Balloniscus Budde-Lund, 1908

***Balloniscus glaber* Araujo & Zardo, 1995**

Balloniscus glaber ARAUJO & ZARDO, 1995:785, figs 1-17; ARAUJO, 1999:250, fig. 18; LOPES *et al.*, 2005:101, table 1; ALMERÃO *et al.*, 2006:474, fig. 4; MEINHARDT *et al.*, 2007:1108, figs 1, 2, tables 1, 2; QUADROS & ARAUJO, 2007:242, figs 1-3, tables 1, 2; 2008:59, figs 1, 2, tables 1-4; QUADROS *et al.*, 2009:244, figs 2, 3, tables 1, 2; QUADROS, 2010:573; APPEL *et al.*, 2011:125, table 1; ALMERÃO *et al.*, 2012:981, fig. 2, tables 1, 2; ZIMMERMANN *et al.*, 2012:712; ZIMMERMANN *et al.*, 2015b:3, tables 1, 2; KENNE & ARAUJO, 2015:430, figs 1-7, tables 1, 2; WOOD *et al.*, 2017:4, figs 1-3, 7.

Material examined. BRAZIL, **Santa Catarina**: ♀, Florianópolis, Praia dos Ingleses, 27°26'S, 48°23'W, 23.X.2004, M. P. Almerão (4096). **Rio Grande do Sul**: many ♂ and ♀, Porto Alegre, Campus do Vale, 30°04'35"S, 51°07'28"W, 10.X.2011, B. L. Zimmermann col. (UFRGS 5150).

Previous Brazilian records. Rio Grande do Sul: Rio Grande and Sapucaia do Sul (ARAUJO & ZARDO, 1995);

Rincão dos Kroeff and Barra do Ouro (LOPES *et al.*, 2005); PE Itapuã, Porto Alegre (ALMERÃO *et al.*, 2006; QUADROS & ARAUJO, 2007, 2008; QUADROS *et al.*, 2009); Águas Belas, Barra do Ribeiro, Cassino, Caxias do Sul, Cidreira, Colônia, Glorinha, Morro Santana, Mostardas, Palmeiras do Sul, Pelotas, Porto Alegre, São Lourenço do Sul, Tapes and Tavares, all municipalities located in Patos Lagoon region (ALMERÃO *et al.*, 2012; KENNE & ARAUJO, 2015); Mariana Pimentel, Mostardas and Porto Alegre (ZIMMERMANN *et al.*, 2015b).

Remarks. In Brazil, *Balloniscus* is represented by two species, *B. glaber* and *B. sellowii* (Brandt, 1833). *B. glaber* differs from *B. sellowii* in the color aspects (three longitudinal pigmented rows, one centrally and one in each lateral margin in *B. sellowii*), telson with apical portion surpassing the distal margin of uropod protopod (not surpassing in *B. sellowii*), and shape of male pleopod 1 exopod with distal margin straight (rounded in *B. sellowii*) (ARAUJO & ZARDO, 1995).

Distribution. This species is recorded from the states of Santa Catarina and Rio Grande do Sul, Brazil.

***Balloniscus sellowii* (Brandt, 1833)**

Philoscia sellowii BRANDT, 1833:43; BUDDE-LUND, 1879:2, 1885:218; MILNE-EDWARDS, 1840:164; STUXBERG, 1875:43.

Philoscia (Balloniscus) sellowii; BUDDE-LUND, 1908:289, pl. XVI, fig. 3; VAN NAME, 1936:136.

Philoscia paulensis; MOREIRA, 1927:194, figs 1-3; 1931:426, figs 1-8.

Balloniscus sellowii; LEMOS DE CASTRO, 1972:357; 1976:392, figs 1-13; ARAUJO *et al.*, 1996:120, figs 22-27, 65; SOUZA-KURY, 1998:654; ARAUJO, 1999:249, fig. 17; LEISTIKOW & WÄGELE, 1999:31; SCHMALFUSS, 2003:51; LOPES *et al.*, 2005:101, table 1; ALMERÃO *et al.*, 2012:981, fig. 2, tables 1, 2; WOOD *et al.*, 2012:234, fig. 2; ZIMMERMANN *et al.*, 2015b:703, fig. 2, tables 1, 2.

Material examined. BRAZIL, **Minas Gerais**: many ♂ and ♀, Itamonte, 20°20'44"S, 44°48'52"W, 07.III.2014, G. M. Cardoso col. (UFRGS 5911). **Paraná**: 9♂, ♀, 1 manca, Lapa, PE do Monge, 25°46'55"S, 49°41'49"W, 11.VIII.2012, P. B. Araujo & B. L. Zimmermann col., impacted area, near of restaurants, in woods (UFRGS 5539). **Santa Catarina**: 2♂, 2♀, Santa Rosa de Lima, 27°59'17"S, 49°06'45"W, at 229 meters, 25.VI.2012, P. B. Araujo col., in pasture woods, litter with many roots (UFRGS 5578); 2♂, ♀, Orleans, near of the fire department, 28°21'17"S, 49°16'26"W, 24.VI.2012, P. B. Araujo & B. L. Zimmermann col., dense vegetation cover, litter with many roots, primary forest (UFRGS 5601).

Previous Brazilian records. Brazil (BUDDE-LUND, 1908). Minas Gerais: Jacutinga (LEMONS DE CASTRO, 1976). Rio de Janeiro: Araruana, Barra de São João, Barra de Maricá, Cabo Frio, Rio de Janeiro and São João da Barra (LEMONS DE CASTRO, 1976). Espírito Santo: Amparo (Monte Alegre and Ibiti) and Barra de Itabapoana (LEMONS DE CASTRO, 1976). São Paulo: São Paulo (MOREIRA, 1927, 1931); Carapicuíba, Estrada Cabreuva-Pirapora, Itanhaem, Parque da Luz, Santo André and São Paulo (LEMONS DE CASTRO, 1976). Paraná: Bituruna and União da Vitória (LEMONS DE CASTRO 1976); Lapa (ZIMMERMANN *et al.*, 2015b). Santa Catarina: Anchieta, Bom

Jardim da Serra, Bom Retiro, Campo Erê, Campos Novos, Catanduvas, Chapecó, Faxinal do Guedes, Florianópolis, Irani, Itá, Lages, Laguna, Papanduva, Ponte Serrada, Praia Grande, Santa Cecília, São Lourenço d'Oeste, São Joaquim, São Miguel d'Oeste, Sombrio, Ubirici and Xanxerê (ARAÚJO *et al.*, 1996); Bocaína do Sul (ZIMMERMANN *et al.*, 2015b). Rio Grande do Sul: Bento Gonçalves and Porto Alegre (LEMOS DE CASTRO, 1976); Agudo, Alegrete, Arroio Grande, Bagé, Bom Jesus, Caçapava do Sul, Camaquã, Capão da Canoa, Capivari, Casca, Coronel Bicaco, Cidreira, Eldorado do Sul, Encruzilhada do Sul, Erechim, Estrela, Flores da Cunha, Fontoura Xavier, Garibaldi, Itaqui, Palmeira das Missões, Pelotas, Pinheiro Machado, Porto Alegre, Rio Grande (E. E. Taim), Rio Pardo, Rosário do Sul, Santiago, Santa Cruz do Sul, Santa Isabel do Sul, Santa Maria, Santana do Livramento, Santo Ângelo, Sarandi, São Gabriel, São Lourenço do Sul, São Luiz Gonzaga, São Vicente do Sul, Tapes, Taquara, Três Passos, Tramandaí, Triunfo, Veranópolis and Viamão (ARAÚJO *et al.*, 1996); Rincão dos Kroeff and Barra do Ouro (LOPES *et al.*, 2005); Águas Belas, Barra do Ribeiro, Cassino, Caxias do Sul, Cidreira, Colônia, Glorinha, Morro Santana, Mostardas, Palmeiras do Sul, Pelotas, Porto Alegre, São Lourenço do Sul, Tapes and Tavares, all municipalities located in Patos Lagoon region (ALMERÃO *et al.*, 2012); Porto Alegre (WOOD *et al.*, 2012); Arroio do Sal, Barra do Ribeiro, Mostardas, Pelotas, Porto Alegre and Vacaria (ZIMMERMANN *et al.*, 2015b).

Distribution. This species is widely distributed in southern Brazil, Uruguay and Argentina.

Scleropactidae

Amazoniscus Lemos de Castro, 1967

Amazoniscus zimmeri Campos-Filho, Montesanto & Araujo *sp. nov.*

(Figs 28-50)

<http://zoobank.org/urn:lsid:zoobank.org:act:59808877-7010-42D0-8774-617AF5E05415>

Type material. BRAZIL, **Pará**: Holotype ♂, Belém, MPEG, 19.XI.2012, P. B. Araujo col. (MZUSP 35110). Paratypes: ♂, 2♀, same data as holotype (MZUSP 35111).

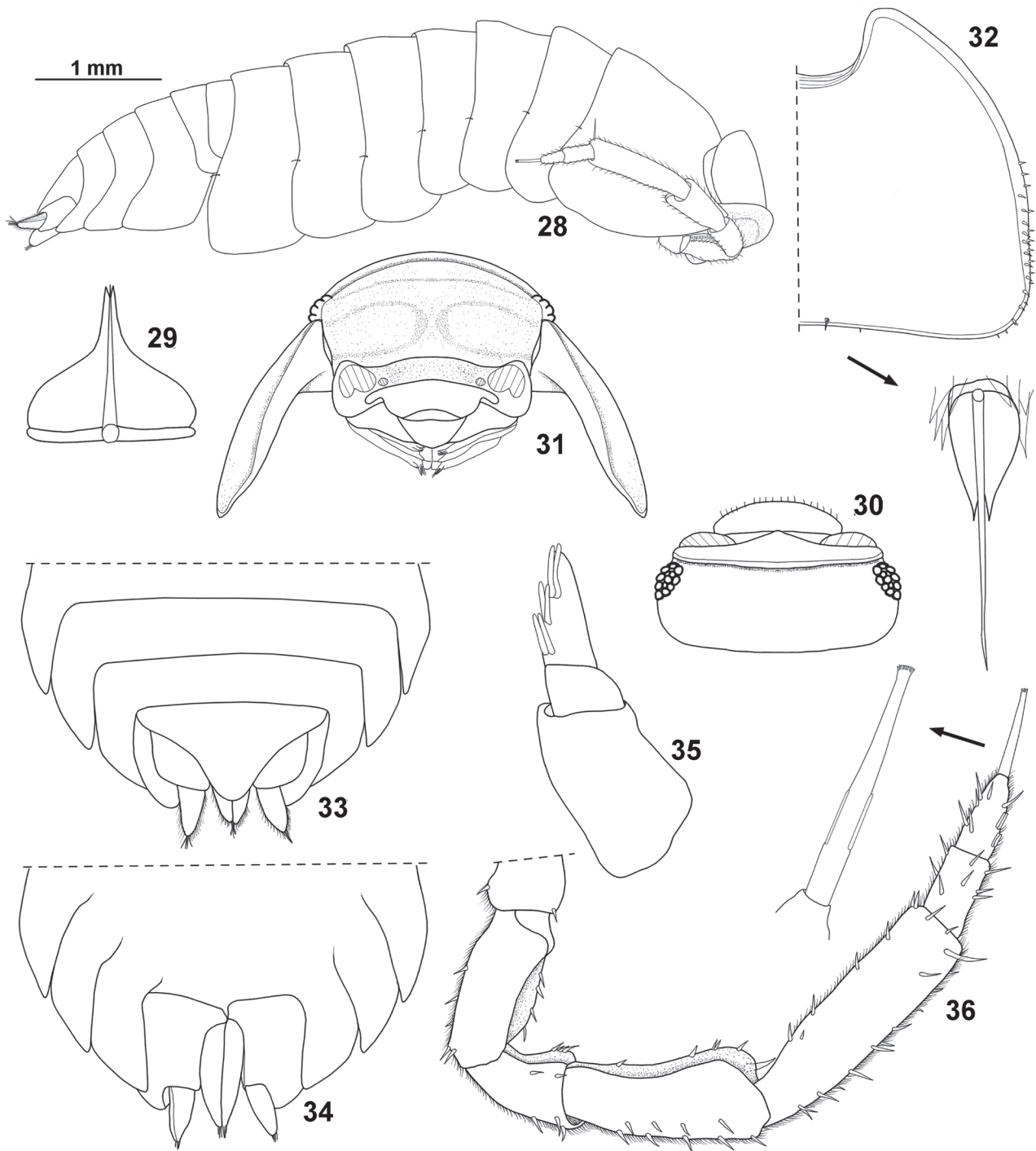
Description. Maximum body length: ♂ 5.5 mm, ♀ 5 mm. Color brown; cephalon with irregular unpigmented spots; antenna, pereon, pleon and uropods strongly pigmented; pereon with some unpigmented spots on paramedian region, pleonites 1-3 with two small unpigmented spots, and telson with 3 small unpigmented spots. Body convex, exoantennal conglobation (Fig. 28). Dorsum smooth, with some scattered triangular scale-setae (Fig. 29); one line of *noduli laterales* per side, more or less at same distance from lateral margins and close to posterior margins of pereonites (Figs 28, 32); no visible gland pores. Cephalon (Figs 30, 31) with frontal shield slightly bent backwards over vertex, frontal margin broadly rounded; eyes of 12-13 ommatidia. Pereonite 1

(Fig. 32) with no schisma or ventral lobe; pereonites 1-4 with posterior margin straight, 5-7 gradually more concave; pereonites 1-7 with posterior margin slightly sinuous at sides (Fig. 28). Pleon (Figs 33, 34) with outline continuous with that of pereonite 7, epimera 3-5 well developed, directed backwards with acute apices. Telson (Fig. 33) triangular, slight concave sides, rounded apex. Antennula (Fig. 35) of three articles, proximal article longest, distal article with three rows of two aesthetascs. Antenna (Fig. 36) reaching posterior margin of second pereonite when extended backwards, fifth article of peduncle longer than flagellum, flagellum of two articles subequal in length, distal article with two rows of two aesthetascs each, apical organ as long as second article of flagellum with simple and short free sensilla. Mandibles (Figs 37, 38) with molar penicil dichotomized, consisting of about 10 branches, left mandible with 2+1 penicils, right with 1+1 penicils. Maxillula (Fig. 39) inner branch bearing two subequal penicils, distal margin rounded; outer branch with 4+6 teeth (four cleft) plus accessory tooth and slender seta. Maxilla (Fig. 40) outer lobe about twice as broad as medial lobe, distal margin rounded; inner lobe rounded, covered with thick setae. Maxilliped (Fig. 41) basis rectangular bearing sparse scale-setae, distal margin with fringe of thin setae; endite rectangular, distal margin almost straight with one small seta on outer portion, and short penicil; palp with three tufts of setae, proximal article with one long inner seta. Pereopods with short inner claw, unguis long and simple, long dactylar seta reaching tip of outer claw (Fig. 43). Pleopods 1 and 2 with respiratory areas. Uropod (Fig. 42) with insertion of endopod and exopod at different levels, protopod flattened and enlarged, endopod twice as long as exopod.

Male: Pereopod 1 (Fig. 43) ischium, merus and carpus with sternal margin covered with short scales. Pereopod 7 (Fig. 44) ischium elongated with almost straight sternal margin; carpus twice as long as merus. Genital papilla as in Fig. 45. Pleopod 1 (Fig. 46) exopod triangular, with convex outer margin; endopod more than twice as long as exopod bearing small setae along inner margin, distal portion tapering. Pleopod 2 (Fig. 47) exopod triangular, outer margin sinuous bearing two small setae; endopod distinctly longer than exopod. Pleopod 3 exopod (Fig. 48) rhomboid, outer margin slightly concave bearing two small setae, inner and outer margins fringed with thin setae. Pleopod 4 exopod (Fig. 49) triangular, outer margin almost straight with three small setae, inner and outer margins fringed with thin setae. Pleopod 5 exopod (Fig. 50) triangular, distal part narrower and acute, outer margin sinuous with one small seta, inner and outer margins fringed with thin setae.

Etymology. The new species is named after Dr. Martin Zimmer for his contribution to the knowledge on the biology of Oniscidea.

Remarks. *Amazoniscus* Lemos de Castro, 1967 includes three Brazilian species from Amazonian rainforest and Atlantic forest domains: *A. arlei* Lemos de Castro, 1967 from the states of Amapá, Pará and Tocantins (LEMOS DE

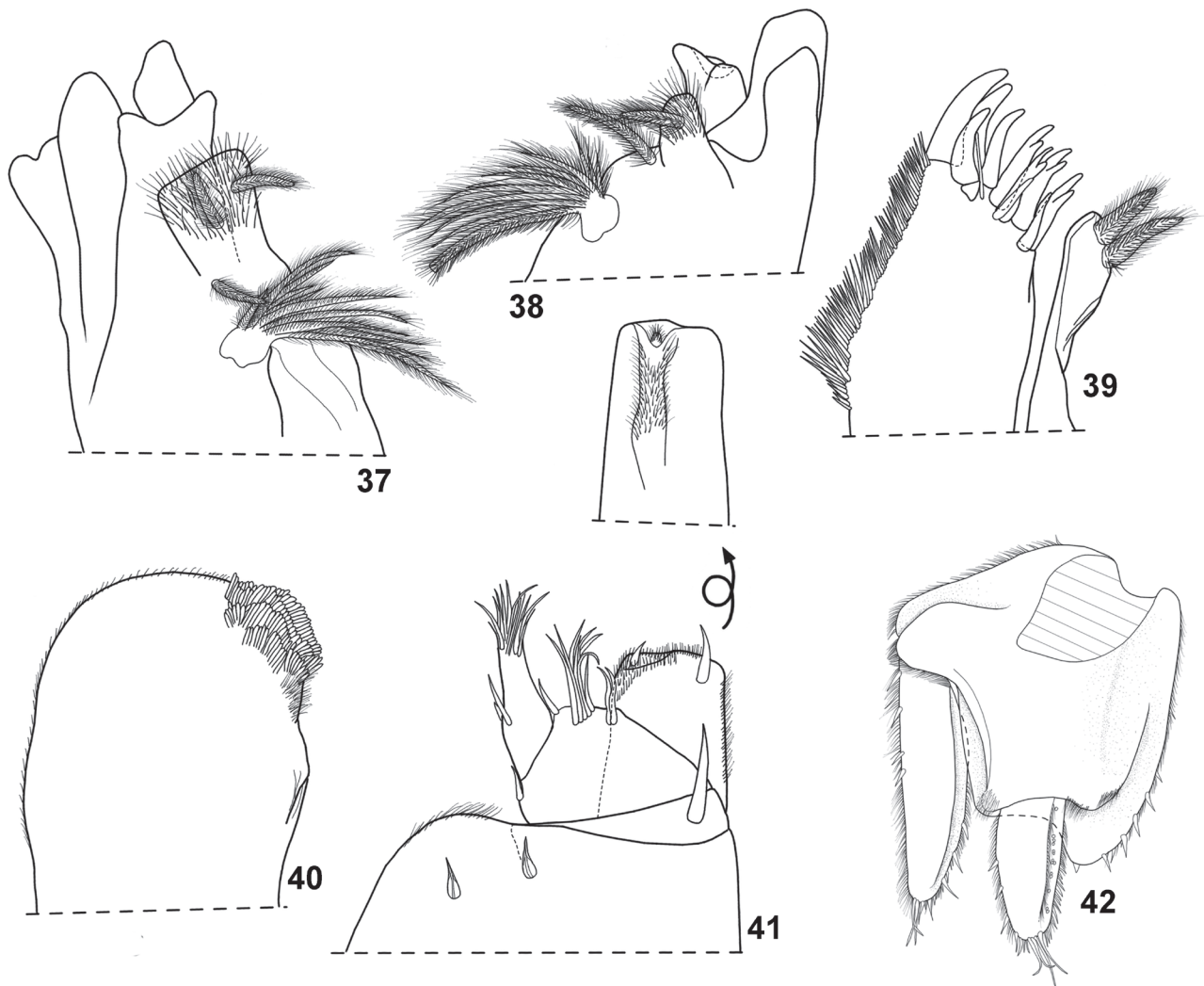


Figs 28-36. *Amazoniscus zimmeri* Campos-Filho, Montesanto & Araujo sp. nov., ♂ paratype: 28, adult specimen, lateral view; 29, dorsal scale-seta; 30, cephalon, dorsal view; 31, cephalon, frontal view; 32, pereonite 1 and *nodulus lateralis*; 33, pleonites 3-5, telson and uropods, dorsal view; 34, pleonites 3-5 and uropods, ventral view; 35, antennula; 36, antenna.

CASTRO, 1967); and two troglobitic species from the state of Pará, *A. eleonoare* Souza, Bezerra & Araújo, 2006 and *A. leistikowi* Campos-Filho, Araujo & Taiti, 2014.

Amazoniscus zimmeri sp. nov. differs from all the other species in the genus by the shape of the male pleopod

1 exopod, i. e. with convex instead of concave outer margin as in *A. arlei*, longer than wide instead of wider than long as in *A. eleonora* and *A. leistikowi*, it also differs from *A. leistikowi* in having the distal part of the male pleopod 1 endopod almost straight instead of distinctly bent outwards.



Figs 37-42. *Amazoniscus zimmeri* Campos-Filho, Montesanto & Araujo sp. nov., ♀ paratype: 37, left mandible; 38, right mandible; 39, maxillula; 40, maxilla; 41, maxilliped; 42, uropod.

***Amazoniscus schmidtii* Campos-Filho, Montesanto & Taiti sp. nov.**

(Figs 51-73)

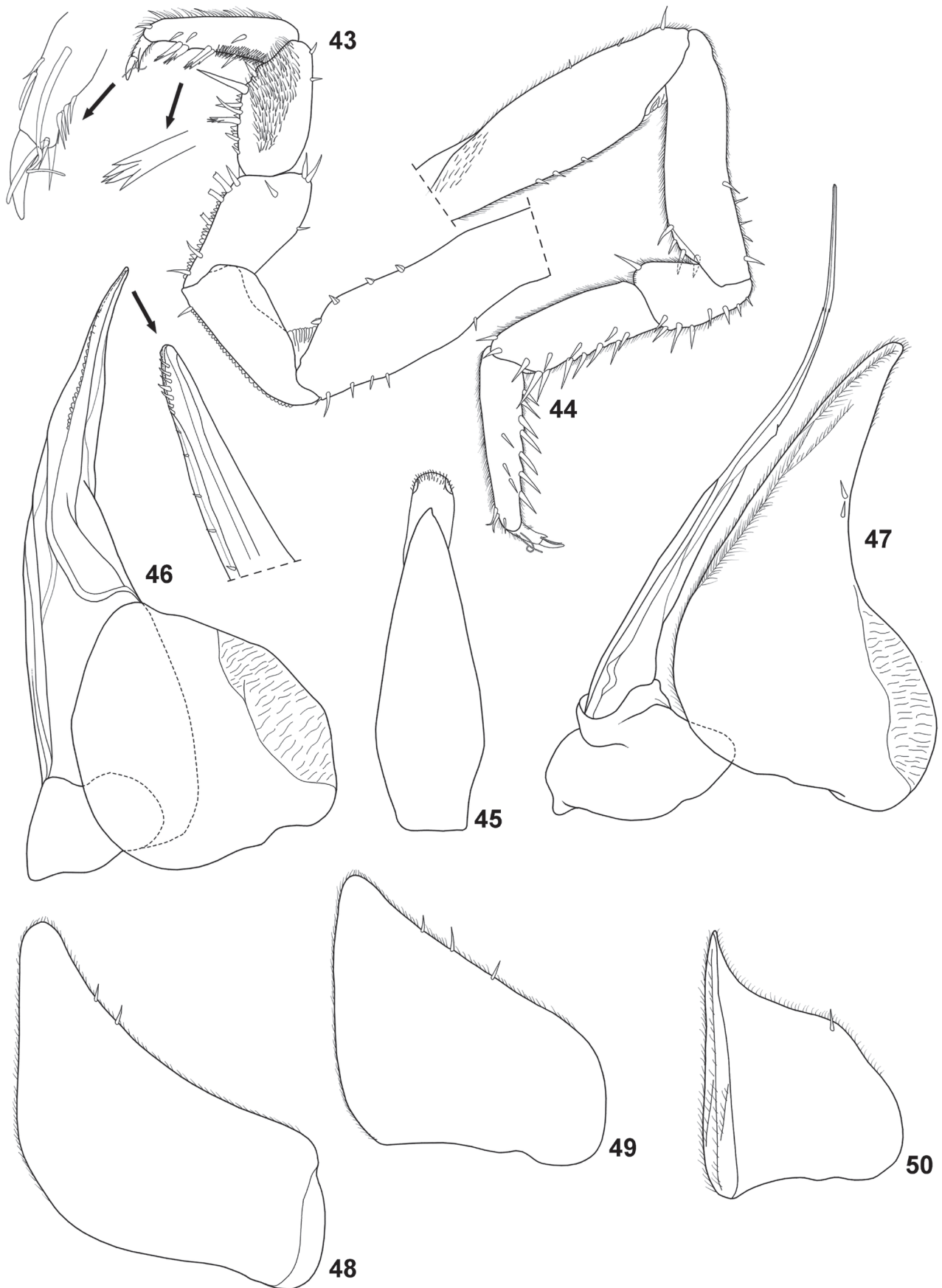
<http://zoobank.org/urn:lsid:zoobank.org:act:4BCD8697-F127-4546-8084-8E9870AB2EE2>

Amazoniscus arlei; SCHMIDT, 2007: 64, figs 192-195 (partim: specimens from Leopoldina, state of Minas Gerais).

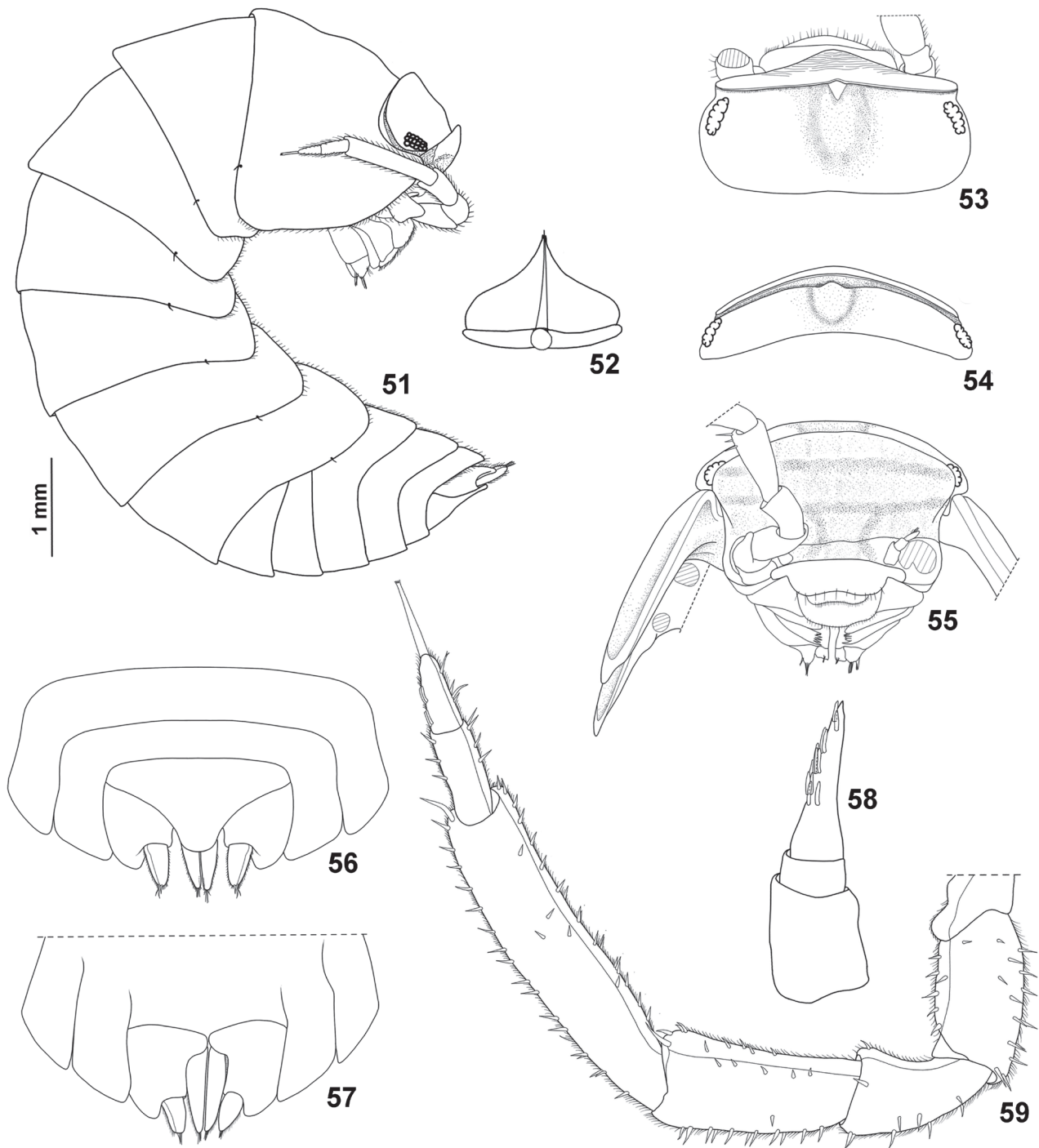
Type material. BRAZIL, **Minas Gerais**: Holotype ♂, Belo Horizonte, undated, H. A. Pinto col. (MZUSP 35112). Paratypes: 3 ♀, same data as holotype (MZUSP 35113).

Description. Maximum body length: ♂ 8.5 mm, ♀ 9.5 mm. Color brown; cephalon with irregular unpigmented spots; antenna unpigmented; pereon more pigmented on median portion and epimera, unpigmented spots on paramedian region; pleon and uropods darker, pleonites 1-3 and telson with two unpigmented spots. Body convex, exoantennal conglobation (Fig. 51). Dorsum smooth with some scattered

triangular scale-setae (Fig. 52); one line of *noduli laterales* per side, more or less at same distance from lateral margins and close to posterior margins of pereonites (Fig. 51); no visible gland pores. Cephalon (Figs 53-55) with frontal shield bent backwards over vertex, frontal margin broadly rounded; eyes of 13-15 ommatidia. Pereonite 1 without schisma or ventral lobes; pereonites 1-4 with posterior margin straight, 5-7 gradually more concave (Figs 51, 55). Pleon (Figs 56, 57) continuous with pereon, epimera 3-5 well developed, directed backwards with acute apex. Telson (Fig. 56) triangular, short, twice as broad as long, with slightly concave sides, rounded apex. Antennula (Fig. 58) of three articles, third article about three times as long as second, bearing five rows of two aesthetascs each and apically pointed. Antenna (Fig. 59) reaching posterior margin of second pereonite when extended back, fifth article of peduncle twice as long as flagellum, flagellum with two articles subequal in length, distal article with two rows of two aesthetascs each, apical organ as long as second article of flagellum with simple and short free sensilla. Mandible (Figs 60, 61) with molar penicil



Figs 43-50. *Amazoniscus zimmeri* Campos-Filho, Montesanto & Araujo sp. nov., ♂ paratype: 43, pereopod 1; 44, pereopod 7; 45, genital papilla; 46, pleopod 1; 47, pleopod 2; 48, pleopod 3 exopod; 49, pleopod 4 exopod; 50, pleopod 5 exopod.



Figs 51-59. *Amazoniscus schmidti* Campos-Filho, Montesanto & Taiti sp. nov., ♂ holotype: 51, adult specimen, lateral view; 52, dorsal scale-seta; cephalon: 53, dorsal view; 54, caudal view; 55, cephalon and pereonites 1 and 2, frontal view; 56, pleonites 4 and 5, telson and uropods, dorsal view; 57, pleonites 4 and 5, and uropods, ventral view; 58 antennula; 59, antenna.

dichotomized, consisting of about 10 branches, left mandible with 2+1 penicils, right with 1+1 penicils. Maxillula (Fig. 62) with inner branch bearing two subequal penicils, distal margin rounded with very short posterior point; outer branch with 4+6 (four cleft) teeth plus accessory tooth and slender seta. Maxilla (Fig. 63) outer lobe about twice as broad as

medial lobe, distal margin rounded, covered with thin setae; inner lobe rounded, covered with thick setae. Maxilliped (Fig. 64) with basis rectangular bearing sparse scale-setae, distal margin with fringe of thin setae; endite rectangular, distal margin slightly rounded with one triangular seta and short penicil; palp with three tufts of setae, proximal article

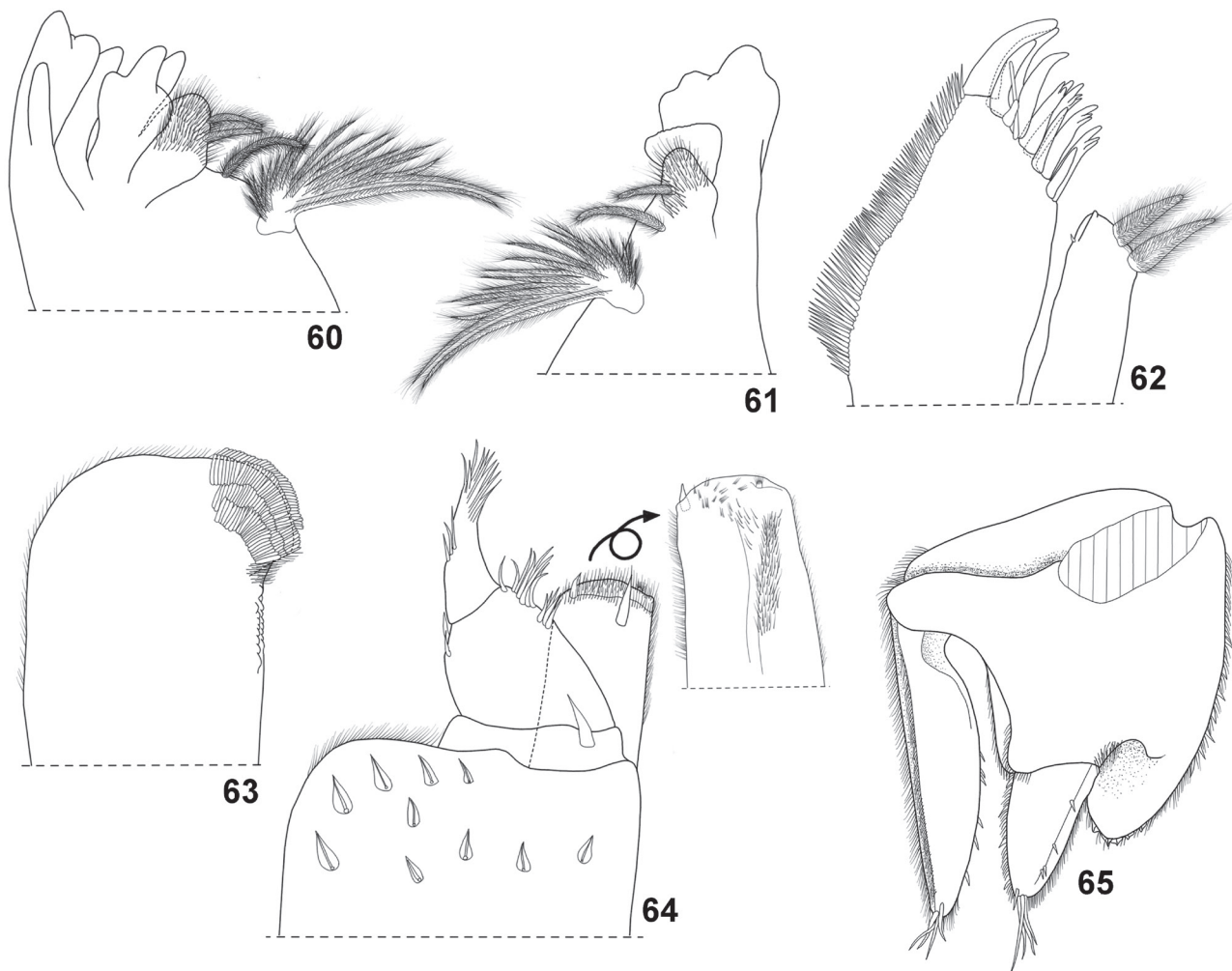
with one inner seta. Pereopods with short inner claw, unguis long and simple, long dactylar seta reaching tip of outer claw. Pleopods 1 and 2 with respiratory areas. Uropod (Fig. 65) with insertion of endopod and exopod at different levels, protopod flattened and enlarged, endopod twice as long as exopod.

Male: cephalon (Figs 53, 54) with rounded dorsal depression on vertex bearing one triangular structure near frontal shield. Pereopod 1 (Fig. 66) merus and carpus with sternal margin covered with short scales and sparse strong setae. Pereopod 7 (Fig. 67) ischium elongated, sternal margin concave; merus with medial ridge bearing setae; carpus twice as long as merus. Genital papilla as in Fig. 68. Pleopod 1 (Fig. 69) exopod with very sinuous outer margin, distal part triangular; endopod longer than exopod, bearing small setae along median margin, distal portion slightly depressed subapically bearing line of small setae. Pleopod 2 (Fig. 70) exopod outer margin strongly sinuous bearing one small seta; endopod as long as exopod. Pleopod 3 and 4 exopods (Figs 71, 72) subrectangular bearing three small setae each, inner and outer margins fringed with thin setae. Pleopod 5 exopod (Fig. 73) triangular, distal part narrower and acute,

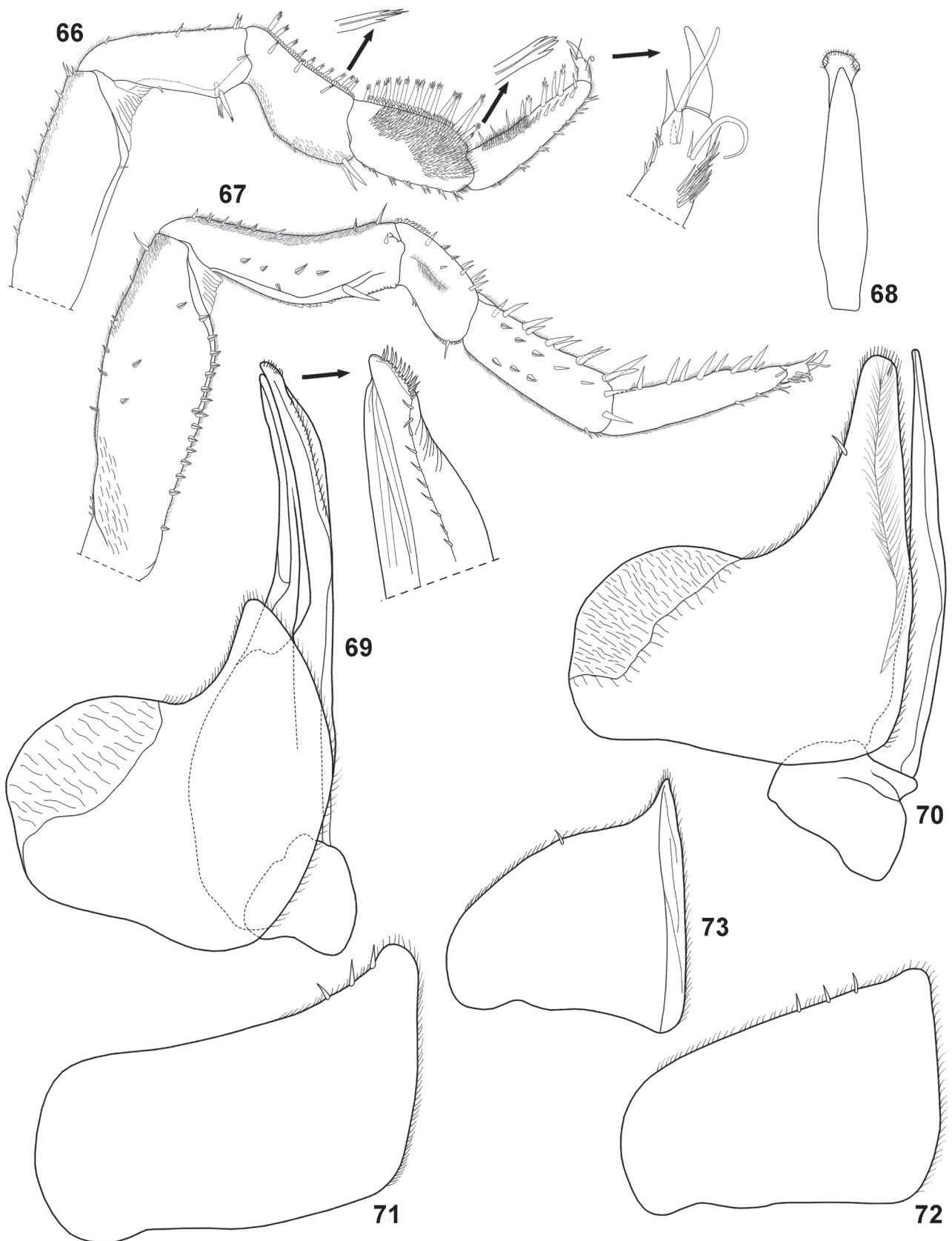
outer margin sinuous with one small seta, inner and outer margins fringed with thin setae.

Etymology. The new species is named after Dr. Christian Schmidt, for his valuable contribution on the taxonomy of the family Scleropactidae.

Remarks. SCHMIDT (2007), in his study of the Neotropical Scleropactidae, redefined the genus *Amazoniscus* and redescribed *A. arlei* based on the type material from the north of Brazil in the states of Amapá and Pará. The author extended the records of this species to the states of Minas Gerais and Rio de Janeiro (southeastern Brazil); the material is deposited in the collection of MNRJ. Based on the illustrations provided by the author, it is possible to observe clear differences between north- and southeastern specimens. The northern specimens show the male pereopod 7 ischium triangular shaped, slightly concave on sternal margin (vs. rounded and strongly concave), the dactylar organ with setose apex (vs. simple), the male pleopod 1 exopod with the distal portion acute (vs. triangular), the male pleopod 1 endopod with distal inner portion bent inwards (vs. depressed and slightly bent outwards). Based on the characters of the male pereopods 1, 2 and 7 and pleopods 1 and 2, we assume



Figs 60-65. *Amazoniscus schmidti* Campos-Filho, Montesanto & Taiti sp. nov., ♀ paratype: 60, left mandible; 61, right mandible; 62, maxillula; 63, maxilla; 64, maxilliped; 65, uropod.



Figs 66-73. *Amazoniscus schmidti* Campos-Filho, Montesanto & Taiti sp. nov., ♂ holotype: 66, pereopod 1; 67, pereopod 7; 68, genital papilla; 69, pleopod 1; 70, pleopod 2; 71, pleopod 3 exopod; 72, pleopod 4 exopod; 73, pleopod 5 exopod.

that the species illustrated by the author from the state of Minas Gerais, corresponds to the new species described here. The material from the state of Rio de Janeiro needs to be re-examined to confirm if it belongs to *Amazoniscus schmidti* sp. nov..

Amazoniscus schmidti sp. nov. is similar to *A. arlei* in the falciform shape of the male pleopod 1 exopod, but it is easily distinguished by the male cephalon with dorsal rounded depression and triangular lobe, male pereopod 1 merus and carpus with slightly sparse setae on sternal margin, carpus 1 with large antennal grooming brush, pereopod 7 ischium long, dorsal margin rounded and strongly concave on sternal margin, dactylar organ simple without hairy appearance, the male pleopod 1 exopod with triangular distal portion, and the male pleopod 1 endopod with distal inner depression and directed outwards.

Circoniscus Pearse, 1917

***Circoniscus bezzii* Arcangeli, 1931**

Circoniscus bezzii ARCANGELI, 1931:115, plate II; VAN NAME, 1936:311, fig. 184; VILELA *et al.*, 1971:185; SOUZA & LEMOS DE CASTRO, 1991:50, figs 23-44; SCHULTZ, 1995:417, fig. 12J-M; SOUZA-KURY, 1998:666; LEISTIKOW & WÄGELE, 1999:38; SCHMALFUSS, 2003:81; SCHMIDT, 2007:72, figs 224-229; CAMPOS-FILHO *et al.*, 2014:396, 0.

Material examined. BRAZIL, **Minas Gerais**: 5♀, 1 juvenile, Serra da Canastra, Casca D'Anta, 20°18'47"S, 46°31'47"W, at 861 meters, 13.VI.2013, riparian forest (UFRGS 5720); ♀, São João Batista da Glória, 20°36'12"S, 46°25'16"W, 13.VI.2013, I. S. Campos-Filho & G. M. Cardoso col., Cerrado biome (UFRGS 5718); ♀, Carmo do Rio Claro, 20°58'05"S, 46°18'43"W, 12.VI.2013, I. S. Campos-Filho & G. M. Cardoso col. (UFRGS 5715); 2♀, Carmo do Rio Claro, 11.VI.2013, I. S. Campos-Filho & G. M. Cardoso col. (UFRGS 5712); ♀, Varginha, 21°33'21"S, 45°26'12"W, 15.VI.2013, I. S. Campos-Filho & G. M. Cardoso col. (UFRGS 5725).

Previous Brazilian records. Minas Gerais: Alfenas (SOUZA & LEMOS DE CASTRO, 1991); Presidente Olegário (CAMPOS-FILHO *et al.*, 2014). Espírito Santo: Linhares and Santa Tereza (SOUZA & LEMOS DE CASTRO, 1991). Mato Grosso: Carandásinho (ARCANGELI, 1931; SOUZA & LEMOS DE CASTRO, 1991). São Paulo: Amparo, Capivari, Descalvado, Mogi-Guaçu, Nova Europa, Pirassununga, São Carlos, Tabatinga and Urucaí (SOUZA & LEMOS DE CASTRO, 1991).

Distribution. This species is recorded from Brazil (states of Minas Gerais, Espírito Santo, Mato Grosso and São Paulo) and Paraguay.

Pudeoniscidae

Pudeoniscus Vandel, 1963

***Pudeoniscus birabeni* Vandel, 1963**

Pudeoniscus birabeni VANDEL, 1963:91, figs 16-19; LEMOS DE CASTRO, 1973:3; SOUZA-KURY, 1998:665; LEISTIKOW & WÄGELE, 1999:43; SCHMALFUSS, 2003:226; SCHMIDT, 2003:79, figs 100-103; LISBOA *et al.*, 2013:395.

Material examined. **Bahia**: ♂, Salvador, Baía de Aratu, IX.2006, J. T. Lisboa col. (UFRGS 4231); ♀, Ilhéus, UESC, 25.VIII.2013, J. T. Lisboa col. (MZUF 9649).

Previous Brazilian records. Bahia: Ilhéus (LISBOA *et al.*, 2013). Rio de Janeiro: Pico de Tijuca, Rio de Janeiro (VANDEL, 1963; SCHMIDT, 2003); Angra dos Reis (Ilha Grande), Mangaratiba (Ribeira, Rubião, Muriqui) and Rio de Janeiro (Açude da Solidão, Floresta da Tijuca, Furnas da Tijuca, Pedra do Conde, Represa dos Ciganos) (LEMONS DE CASTRO, 1973). São Paulo: Estrada Velha Santos-São Paulo, Piassaguera and Santos (LEMONS DE CASTRO, 1973).

Distribution. This species is recorded from the states of Bahia, Rio de Janeiro and São Paulo.

Platyarthridae

Remarks. At present the family Platyarthridae includes more than 110 species in nine genera, mainly distributed in tropical areas. The family is most probably paraphyletic (SCHMIDT, 2003). Recently, the new family Paraplatyarthridae Javidkar & King, 2015 (Crinocheta) was erected to accommodate the new genus and the new species *Paraplatyarthrus subterraneus* Javidkar & King, 2015 from Laverton Downs, Windarra calcrete, Eastern Murchison region, Western Australia (JAVIDKAR *et al.*, 2015), and an unnamed and undescribed genus from southern Brazil. These two species are morphologically very similar to the genus *Trichorhina*, presently included in the Platyarthridae. Paraplatyarthridae is defined by dorsal surface with fan-like scale setae, antenna ventrally with leaf-like setae and furrow with hair-like capillary setae, part of water conduction system (WCS), flagellum of two articles, cephalon with postfrons and profons fused, maxillula outer endite with 4+4/5 teeth (one shorter). The family was erected with an integrative taxonomy approach, using molecular and morphological data, and it was recovered as monophyletic. At the moment, the morphological characters proposed by the authors to define the family do not show any synapomorphy, which allows its recognition. This also occurs in phylogenetical analyses of other genera of Oniscidea (see SCHMIDT 2002, 2003). The dorsal fan-shaped scale-setae are shared with other genera and families of Crinocheta, for example, some members of Philosciidae (*Caraiboscia* Vandel, 1968, *Metaprosekia* Leistikow, 2000) (see LEISTIKOW, 2000; CAMPOS-FILHO *et al.*, 2014), members of Dubioniscidae Schultz, 1995 (see CARDOSO *et al.*, 2016), members of Spelaeoniscidae Vandel, 1948 (see SCHMIDT, 2003), and the genus *Chileoniscus* Taiti, Ferrara & Schmalzfuss, 1986 (*incertae sedis*) (see SCHMIDT, 2007). This structure seems to be related with an endogean way of life and it has an anti-adhesive function (SCHMALFUSS, 1978). Most probably this structure evolved by convergence or parallelism since it occurs in different families of Crinocheta (SCHMIDT, 2002). The furrow bearing setae on the antenna belongs to the WCS (HOESE, 1981; SCHMALFUSS, 1998), and it is present in many different Crinocheta families (see SCHMIDT, 2003). The fused postfrons and profons on the cephalon,

together with the 4+4/5 teeth on the maxillula outer endite are present in many genera of Crinocheta (LEISTIKOW, 2001; SCHMIDT, 2003, 2007). Recently, JAVIDKAR *et al.* (2017) added new diagnostic characters to the family, such as dorsal surface smooth, one line of *noduli laterales* per side on pereonites 1-6 and pereonite 7 with two *noduli laterales* per side. The presence of two *noduli laterales* per side on pereonite 7 is also observed in *Trichorhina tomentosa* (Budde-Lund, 1893), type species of the genus (see SCHMIDT, 2003), as well as in members of Philosciidae, i. e. *Barnardoscia* Taiti & Ferrara, 1982, *Anchiphiloscia* Taiti & Ferrara, 1980, and *Benthanops* Barnard, 1932, *Hawaiioscia* Schultz, 1973 (see TAITI & FERRARA, 1987). In conclusion, if the family Paraplatyartridae might be well characterized molecularly, it does not seem to be so from a morphological point of view.

Trichorhina Budde-Lund, 1908

***Trichorhina argentina* Vandel, 1963**

Trichorhina argentina VANDEL, 1963:73, fig. 6; ARAUJO & BUCKUP, 1996a:800, figs 1-15, 41; LEISTIKOW & WÄGELE, 1999:28; SCHMALFUSS, 2003:275; LOPES *et al.*, 2005:101, table 1; SOUZA *et al.*, 2011:241; CAMPOS-FILHO *et al.*, 2014:405; ZIMMERMANN *et al.*, 2015b:3, table 1.

Material examined. BRAZIL, **Santa Catarina**: 3♂, ♀, Rancho Queimado, Bauer Hotel, 27°40'57"S, 49°02'41"W, 25.VI.2012, P. B. Araujo & B. L. Zimmermann col., impacted area, in woods (UFRGS 5571).

Previous Brazilian records. Santa Catarina: Joaçaba and Sombrio (ARAUJO & BUCKUP, 1996a). Rio Grande do Sul: Caçapava do Sul, Camaquã, Camobi (UFMS), Eldorado do Sul and Rio Grande (E. E. Taim) (ARAUJO & BUCKUP, 1996a); Rincão dos Kroeff and Barra do Ouro (LOPES *et al.*, 2005); Porto Alegre (ZIMMERMANN *et al.*, 2015b).

Distribution. This species is recorded from southern Brazil (states of Santa Catarina and Rio Grande do Sul) and eastern Argentina.

***Trichorhina bicolor* Araujo & Buckup, 1996**

Trichorhina bicolor ARAUJO & BUCKUP, 1996a:806, figs 26-41; LEISTIKOW & WÄGELE, 1999:28; SCHMALFUSS, 2003:275; SOUZA *et al.*, 2011:241.

Material examined. BRAZIL, **Paraná**: ♀, Matinhos, PARNAT Saint-Hilaire Lang, PR-508 road, 25°38'39"S, 48°36'04"W, 10.VIII.2012, P. B. Araujo & B. L. Zimmermann col., in leaf litter (UFRGS 5557); 2♂, 4♀, Antonina, near of Nunes river, road from Guaraqueçaba, 25°20'48"S, 48°46'05"W, 10.VIII.2012, P. B. Araujo & B. L. Zimmermann col., camping area (UFRGS 5515). **Santa Catarina**: ♂, 3♀, Corupá, RPPN Rota das Cachoeiras, 26°24'08"S, 49°20'40"W, 28.VI.2012, P. B. Araujo & B. L. Zimmermann col. (UFRGS 5595); ♂, Corupá, near of the ecological hotel, 26°25'23"S, 49°14'46"W, 27.VI.2012, P. B. Araujo & B. L. Zimmermann col., under Palm tree leaves (UFRGS 5590); ♀, Rio Fortuna, 28°06'09"S, 49°07'35"W, 25.VI.2012, alt. 229 meters, P. B. Araujo & B. L. Zimmermann col., in

woods on pasture area, many roots, impacted area (UFRGS 5581); 5♂, 6♀, Orleans, behind Real Nob Hotel, 28°21'17"S, 49°16'29"W, 24.VI.2012, P. B. Araujo & B. L. Zimmermann col., humid forest, in bromeliads leaves (UFRGS 5565).

Previous Brazilian records. Santa Catarina: Pouso Redondo, São Bonifácio and Tubarão (ARAUJO & BUCKUP, 1996a).

Distribution. This species is recorded from Brazil (states of Paraná and Santa Catarina).

***Trichorhina kaingangi* Campos-Filho, 2015**

Trichorhina kaingangi CAMPOS-FILHO *et al.*, 2015b:114, figs 2-4.

Material examined. BRAZIL, **Paraná**: ♂, 3♀, São Mateus do Sul, near of road, 25°57'30"S, 50°31'10"W, 11.VIII.2012, P. B. Araujo & B. L. Zimmermann col., in woods, impacted area (MZUF 9659).

Previous Brazilian records. Paraná: Ermida Paiol do Alto cave, Adrianópolis and Água Boa cave, Almirante Tramandaré (CAMPOS-FILHO *et al.*, 2015b).

Distribution. This species is recorded only from the state of Paraná, Brazil.

***Trichorhina tomentosa* (Budde-Lund, 1893)**

Alloniscus tomentosus BUDDÉ-LUND, 1893:126.

Trichorhina tomentosa; LEMOS DE CASTRO, 1967:315, 1971:10, fig. 6; LENKO, 1971:5; SOUZA-KURY, 1997:181, figs 1, 4-7; 1998:663; ARAUJO & BUCKUP, 1996a:803, figs 16-25, 41; LEISTIKOW & WÄGELE, 1999:30; SOUZA *et al.*, 2011:241.

Material examined. BRAZIL, **Bahia**: 5♀, Itajú-Itapé, 15°01'58"S, 39°36'15"W, 17.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5815); 8♀, Una, ReBio Una, 15°10'08"S, 39°00'03"W, 19.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5814). **Minas Gerais**: ♀, Itamonte, 20°20'44"S, 44°48'52"W, 07.III.2014, G. M. Cardoso col. (UFRGS 5910). **Paraná**: 4♀, Antonina, near of Nunes river, road from Guaraqueçaba, 25°20'48"S, 48°46'06"W, 10.VIII.2012, P. B. Araujo & B. L. Zimmermann col., camping area (UFRGS 5514); 4♀, São Mateus do Sul, 25°57'30"S, 50°31'10"W, 11.VIII.2012, P. B. Araujo & B. L. Zimmermann col., open vegetation cover, in woods (UFRGS 5510). **Santa Catarina**: 4♀, Rio Fortuna, SC-482 road, 28°21'05"S, 49°09'58"W, 25.VI.2012, P. B. Araujo, B. L. Zimmermann & A. Ferrari col., in abandoned house, between tiles and bricks (UFRGS 5606). **Rio Grande do Sul**: ♀, Rio da Várzea, 27°13'16"S, 53°19'12"W, 26.VII.2013, at 538 meters, G. M. Cardoso col., abandoned house (UFRGS 5734).

Previous Brazilian records. Pará: Belém (LEMOS DE CASTRO, 1967), Park of MPEG, Belém (SOUZA-KURY, 1998). Espírito Santo, Minas Gerais, Pará, Rio de Janeiro and São Paulo (LEMOS DE CASTRO, 1971). São Paulo: Barueri and São Paulo (LENKO, 1971). Santa Catarina: Blumenau,

Pouso Redondo, Sombrio and Tubarão (ARAUJO & BUCKUP, 1996a). Rio Grande do Sul: Fontoura Xavier and Porto Alegre (FZBRS) (ARAUJO & BUCKUP, 1996a).

Remarks. The synonym list presented here includes the original description and the papers mentioning Brazil. The complete list is available in SCHMALFUSS (2003).

Distribution. Circumtropical species. In Brazil this species is considered to be introduced and it is recorded from the states of Pará, Bahia, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo to Rio Grande do Sul.

Trachelipodidae

Nagurus Holthuis, 1949

Nagurus cristatus (Dollfus, 1889)

Porcellio cristatus DOLLFUS, 1889:91, pl. V, figs 2a-d.

Nagurus cristatus; LEMOS DE CASTRO, 1967:323, 1971:7, fig. 7; VILELA *et al.*, 1971:184, figs 1-4; ARAUJO & BUCKUP, 1996b:161, figs 1 and 3; SOUZA-KURY, 1998:668.

Material examined. BRAZIL, **Bahia**: many ♂ and ♀, Camamu, 13°56'59"S, 39°06'27"W, 18.IX.2013, I. S. Campos-Filho & J. T. Lisboa col. (UFRGS 5780).

Remarks. The synonym list presented here includes the original description and the works mentioning Brazil. The complete list is available in Schmalfluss (2003).

Previous Brazilian records. Pará: Belém (Várzea do Guamá and Park of MPEG), Castanhal, and Peixe-Boi (LEMONS DE CASTRO, 1967). São Paulo and Rio de Janeiro (LEMONS DE CASTRO, 1971). Mato Grosso: Dourados (VILELA *et al.*, 1971). Santa Catarina: Gravatal, Major Gerciano, Nova Teutônia and Pouso Redondo (ARAUJO & BUCKUP, 1996b).

Distribution. Circumtropical. In Brazil, this species is recorded from the states of Mato Grosso, Pará, Rio de Janeiro, São Paulo and Santa Catarina.

Nagurus nanus (Budde-Lund, 1908)

Porcellio (Nagara) nana BUDDE-LUND, 1908:285, taf. 14, figs 40-47.

Nagurus nanus; ARAUJO & BUCKUP, 1996b:161, figs 2, 3.

Material examined. BRAZIL, **Santa Catarina**: 5♂, 3♀, São João Batista, 27°15'52"S, 48°51'12"W, 26.VI.2012, P. B. Araujo & B. L. Zimmermann col., in woods (UFRGS 5598).

Previous Brazilian records. Santa Catarina: Gravatal (ARAUJO & BUCKUP, 1996b).

Remarks. The synonym list presented here includes the original description and the works mentioning Brazil. The complete list is available in SCHMALFUSS (2003).

Distribution. Tropical and subtropical areas. In Brazil this species is recorded only from the state of Santa Catarina.

Armadillidiidae

Armadillidium Brandt, 1833

Armadillidium vulgare (Latreille, 1804)

Armadillo vulgare Latreille, 1804:48.

Armadillidium vulgare; LEMOS DE CASTRO, 1971:4, fig 14; LENKO, 1971:8; ARAUJO *et al.*, 1996:133, figs 54-58, 68; SOUZA-KURY, 1998:654; LEISTIKOW & WÄGELE, 1999:43; ARAUJO, 1999:252, fig. 23; SCHMALFUSS, 2003:38; APPEL *et al.*, 2011:124, figs 1B, 2D-F; CAMPOS-FILHO *et al.*, 2014:412, fig. 40.

Material examined. BRAZIL, **Minas Gerais**: many ♂ and ♀, Itamonte, 20°20'44"S, 44°48'52"S, 07.III.2014, G. M. Cardoso col. (UFRGS 5909). **São Paulo**: ♀, Campos do Jordão, 22°45'08"S, 45°37'38"W, 08.VI.2013, I. S. Campos-Filho & G. M. Cardoso col., *Pinus* and *Araucaria* forest (UFRGS 5855). **Rio Grande do Sul**: ♂, Fontoura Xavier, 29°0'17"S, 52°21'W, 27.VII.2013, G. M. Cardoso col. (UFRGS 5726).

Previous Brazilian records. Bahia, Minas Gerais, São Paulo, Rio de Janeiro and Rio Grande do Sul (LEMONS DE CASTRO, 1971). Minas Gerais: São Roque de Minas, Serra da Canastra, Gruta Zeferino I cave (CAMPOS-FILHO *et al.*, 2014). São Paulo: Barueri, Cidade Universitária (São Paulo city), and Salesópolis (E. E. da Boracéia) (LENKO, 1971). Santa Catarina: Anchieta, Blumenau, Bom Retiro, Campos Novos, Catanduvas, Faxinal dos Guedes, Florianópolis, Itá, Joaçaba, Lages, Mondaí, Ponte Serrada, São Miguel d'Oeste, São Lourenço d'Oeste, Santa Cecília, Sombrio, Urussanga, and Xanrerê (ARAUJO *et al.*, 1996). Rio Grande do Sul: Agudo, Arroio Grande, Bagé, Caçapava do Sul, Camaquã, Capão da Canoa, Casca, Caxias do Sul, Coronel Bicaco, Dom Pedrito, Encruzilhada do Sul, Erechim, Flores da Cunha, Garibaldi, Iraí, Mata, Nhu-Porã, Otávio Rocha, Palmeira das Missões, Panambi, Pantano Grande, Passo Fundo, Pinheiro Machado, Porto Alegre, Rio Grande (E. E. Taim), Rio Pardo, Rosário do Sul, São Borja, São Francisco, São Gabriel, São Lourenço do Sul, São Luiz Gonzaga, São Vicente do Sul, Santa Cruz do Sul, Santa Isabel do Sul, Santa Maria, Santa Rosa, Santana do Livramento, Santiago, Santo Ângelo, Sarandi, Tapes, Taquara, Tramandaí, Três Passos, Veranópolis (ARAUJO *et al.*, 1996).

Remarks. The synonym list presented here includes the original description and the works mentioning Brazil. The complete list is available in Schmalfluss (2003).

Distribution. Mediterranean species introduced into many parts of the world.

Eubelidae

Ethelum Budde-Lund, 1899

Ethelum americanum (Dollfus, 1896)

Mesarmadillo americanus DOLLFUS, 1896:397, figs 11a-d; RICHARDSON, 1901:573.

Ethelum americanum; BUDDE-LUND, 1899: 90, pl. III, figs 10-12; RICHARDSON, 1905:589, figs 649, 650; PEARSE, 1917, pl. I; VAN NAME, 1925:484, figs 27-36; PAULIAN DE FÉLICE, 1944:145; LEMOS DE CASTRO, 1967:312; SOUZA-KURY, 1998:657; LEISTIKOW & WÄGELE, 1999:42; SCHMALFUSS, 2003:95.

Material examined. BRAZIL, **Pará**: ♂ (part in micropreparations), Belém, MPEG, Campus de pesquisa, 11.IV.2014, J.T. Lisboa col., under tree barks, in front of the restaurants (MZUF 9650).

Previous Brazilian records. Pará: Apeú, Castanhal (LEMONS DE CASTRO, 1967).

Distribution. Lesser Antilles, northern Brazil (state of Pará), French Guiana, Guyana, and northern Venezuela.

Armadillidae

Ctenorillo Verhoeff, 1942

***Ctenorillo tuberosus* (Budde-Lund, 1904), comb. nov.**

(Figs 74-97)

Armadillo tuberosus BUDDE-LUND, 1904:109, pl. X, figs 1-4.

Reductoniscus tuberosus; KESSELYAK, 1930:61; LEMONS DE CASTRO, 1972:357.

Cubaris tuberosa VAN NAME, 1936:377, fig. 288, 1940:134.

Venezillo tuberosus; SOUZA-KURY, 1998:654; LEISTIKOW & WÄGELE, 1999:51; JEPPESEN, 2000: 262; SCHMALFUSS, 2003:293.

Material examined. BRAZIL, **Ceará**: 3♂, 5♀, Fortaleza, Campus Pici, 29.V.2013, F. B. Ribeiro col., in cashew tree (MZUF 9651).

Previous Brazilian records. Bahia: Abrolhos Archipelagous (LEMONS DE CASTRO, 1972).

Redescription. Maximum body length: ♂ 2.5 mm, ♀ 3.5 mm. Color brown. Endoantennal conglobation (Figs 74, 78). Dorsum covered with large ribs and tubercles, arranged as follows (Fig. 75): vertex of cephalon with one anterior row of six tubercles and one posterior row of four tubercles; pereonites 1-7 with many tubercles and ribs as in Figs 74, 75; pleonites 3 and 4 with one row of four tubercles, pleonite 5 and telson with two paramedian tubercles each. Dorsal surface with short triangular scale-setae (Fig. 76). Pereonites 1-7 with one *nodulus lateralis* per side inserted on lateral surface of the second outer tubercle (Fig. 74). Cephalon (Figs 77, 78) with frontal shield slightly protruding above vertex and concave in middle; eyes of about 10 ommatidia. Pereonite 1 grooved on lateral margin for about two-thirds of its length, inner lobe of schisma rounded, not extending beyond posterior margin of outer lobe (Figs 78, 79). Pereonite 2 with triangular ventral lobe not extending beyond posterior margin of epimeron (Fig. 78). Pereonites 2-7 with quadrangular epimera (Fig. 74). Telson (Figs 80, 81) hourglass-shaped, proximal part broader than distal part, distal margin slightly convex. Antennula (Fig. 82) of three articles with three apical and two subapical aesthetascs. Antenna (Fig. 83) short and stout, slightly surpassing rear margin of cephalon; flagellum with second article about twice as long as first; apical organ about 1/3 as long as second article of flagellum. Mandible (Figs 84, 85) with molar penicil dichotomized, consisting of several plumose setae; left mandibles with 2+1 and right mandible with 1+1 free penicils. Maxillula (Fig. 86) with outer branch bearing 4+4 simple teeth; inner branch with two long penicils. Maxilla (Fig. 87) bilobate, inner lobe distinctly narrower than outer lobe. Maxilliped (Fig. 88) endite with subapical large seta overpassing distal margin, two short triangular spines distally; palp with two setae

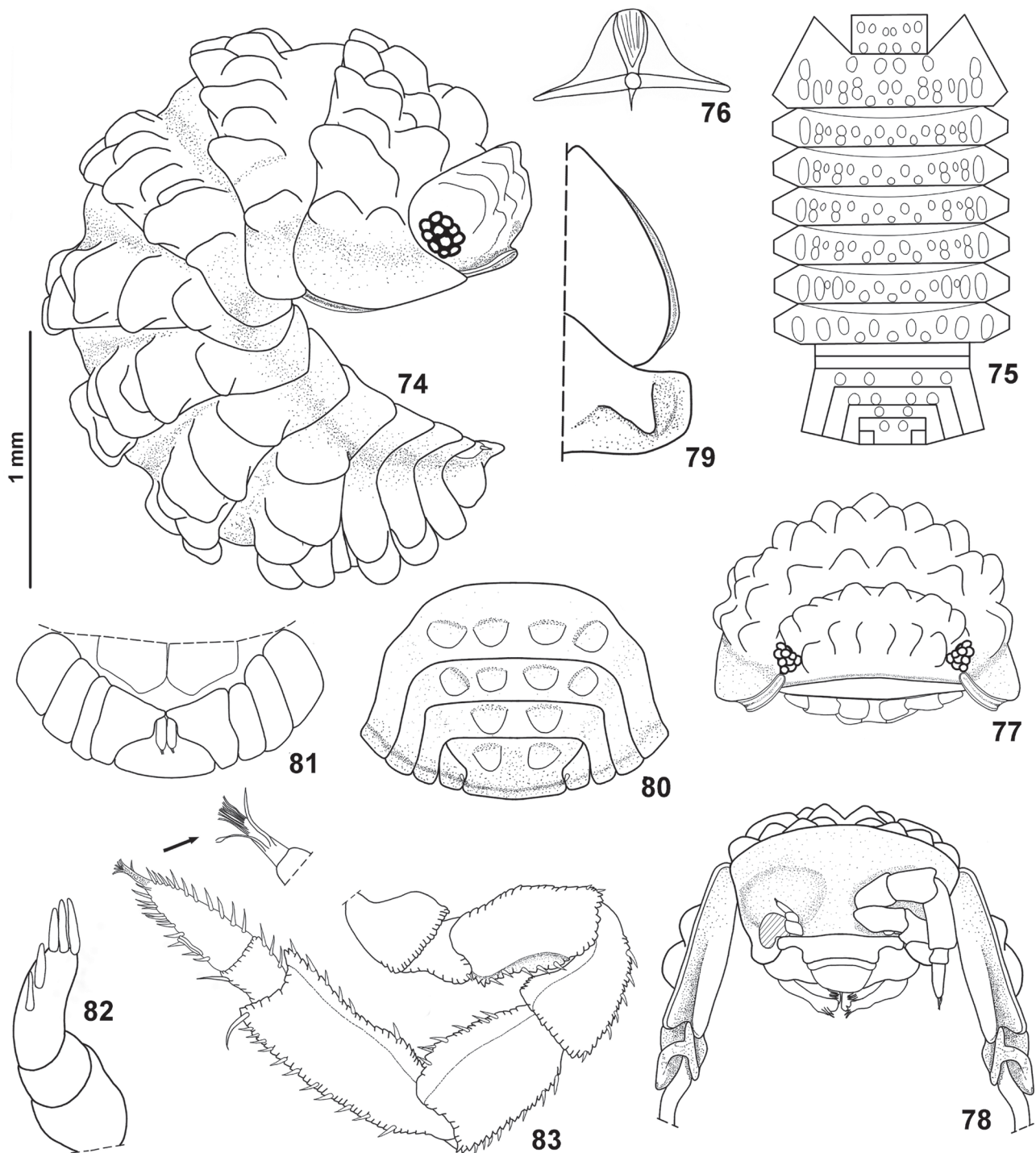
on the basal article. Pleopods 1-5 with monospiracular respiratory structures. Uropod (Fig. 89) protopod flattened, enlarged on basal part, distal part trapezoidal, with medial margin slightly concave; exopod very short, inserted dorsally near medial margin of protopod.

Male: Pereopod 1 and 7 (Figs 90, 91) with no particular modifications. Genital papilla as in Fig. 92. Pleopod 1 (Fig. 93) exopod small, wider than long, distal portion triangular, outer margin concave and crenulate; endopod with distal portion slightly bent outwards and slightly swollen. Pleopod 2 (Fig. 94) exopod triangular, with outer margin distinctly concave; endopod longer than exopod. Pleopod 3-5 exopods as in Fig. 95-97.

Remarks. This species was described by BUDDE-LUND (1904) as *Armadillo tuberosus* from Port au Prince, Haiti. It was later included in *Reductoniscus* by KESSELYAK (1930) and then in *Cubaris* by (VAN NAME, 1936). The examination of the specimens from Brazil, certainly belonging to this species, showed that it belongs to *Ctenorillo* as redefined by SCHMALFUSS & FERRARA (1983), of which the genus *Tuberdillo* Arcangeli, 1941, is a junior synonym (see TAITI *et al.*, 1998). In fact, it has the cephalon, pereon, pleon and telson with developed costae and tubercles; the cephalon with the frontal lamina protruding above the vertex; pereon, pleon epimera and telson obliquely bent outward; pereonite 1 with schisma; ventral lobe of pereonite 2 tooth-shaped; epimera of pereonites 2-7 rectangular; telson hour-glass-shaped with basal part with two paramedial tubercles and distal part bent outwards with apex truncate; antenna short and thickset; uropod with tiny exopodite.

To date *Ctenorillo* included 13 species (SCHMALFUSS, 2003; CAMPOS-FILHO *et al.*, 2014): *C. ausseli* (Dollfus, 1893), from the Canary Islands; *C. bananae* (Van Name, 1920), from Cameroon, Congo and Angola; *C. buddehundi* Verhoeff, 1942, from Uganda and Kenya; *C. fagei* (Paulian de Félice, 1941), from Ivory Coast; *C. ferrarai* Campos-Filho, Araujo & Taiti, 2014 from Brazil; *C. gabunensis* (SchmalFUSS & Ferrara, 1983), from Gabon; *C. guinensis* (SchmalFUSS & Ferrara, 1983), from Guinea; *C. kenyensis* Schmolzer, 1974, from Uganda and Tanzania; *C. legai* (Arcangeli, 1941), from Ethiopia; *C. mineri* (Van Name, 1936), from Venezuela and Guyana; *C. parituberculatus* (Taiti & Ferrara, 1987), from Malawi; *C. regulus* (Van Name, 1920), from Zaire and Somalia; and *C. strinatii* (SchmalFUSS & Ferrara, 1983), from Congo. The species of the genus are mainly distinguished by the number and disposition of dorsal tubercles. In having four tubercles on pleonites 3 and 4 and two on pleonite 5 and telson, *C. tuberosus* resembles *C. gabunensis*, from which it differs in the number and disposition of tubercles on the cephalon and pereon (compare Fig. 75 with Fig. 154 in SCHMALFUSS & FERRARA 1983).

Distribution. Haiti, St. Thomas Island, and Brazil (state of Bahia). It is also recorded from the Botanical Garden, Dahlem, near Berlin (KESSELYAK, 1930; VAN NAME, 1936).



Figs 74-83. *Ctenorillo tuberosus* (Budde-Lund, 1904), ♂: 74, adult specimen, lateral view; 75, disposition of dorsal tubercles; 76, dorsal scale-seta; 77, cephalon and pereonites 1, dorsal view; 78, cephalon and pereonites 1 and 2, frontal view; 79, epimera of pereonites 1 and 2, ventral view; 80, pleonites 3-5, telson and uropods, dorsal view; 81, pleonites 3-5, telson and uropods, ventral view; 82, antennula; 83, antenna.

Cubaris Brandt, 1833
Cubaris murina Brandt, 1833

2006:18; APPEL *et al.*, 2011:124, fig. 2B, C; CAMPOS-FILHO *et al.*, 2014:417, fig. 40; ZIMMERMANN *et al.*, 2015b:3, table 1.

Cubaris murina BRANDT, 1833:190; LEMOS DE CASTRO, 1967:328; 1971:12, fig. 13; VILELA *et al.*, 1971:184; ARAUJO *et al.*, 1996:129, figs 46-47; SOUZA-KURY, 1998:653; LEISTIKOW & WÄGELE, 1999:44; SCHMALFUSS, 2003:81; NIEMEYER *et al.*, 2006:14; 2009:138; NIEMEYER & DA SILVA,

Material examined. BRAZIL, **Espírito Santo**: many ♂ and ♀, Linhares, 19°25'45"S, 40°05'12"W, 11.III.2014, G. M. Cardoso col. (UFRGS 5971). **Mato Grosso do Sul**:

3♂, 2♀, 1 manca, Bonito, Bonito HI-Hostel, 21°07'22"S, 56°30'06"W, 12.XI.2014, G. M. Cardoso col. (UFRGS 6011); 2♂, 3♀, Jardim, RPPN Rio da Prata, 21°27'41"S, 56°26'23"W, 13.XI.2014, G. M. Cardoso col. (UFRGS 6014). **Santa Catarina:** ♂, 4♀, Florianópolis, Praia Jurerê, 27°26'S, 48°29'W, 04.III.2005, P. B. Araujo col. (UFRGS 6475)

Previous Brazilian records. Pará: Arapera (LEMONS DE CASTRO, 1967). Pará, Bahia, Minas Gerais, Espírito Santo, Rio de Janeiro and São Paulo (LEMONS DE CASTRO, 1971). Bahia: Simões Filho (NIEMEYER *et al.*, 2006, 2009; NIEMEYER & DA SILVA, 2006); Gruta dos Brejões, Morro do Chapéu (CAMPOS-FILHO *et al.*, 2014). Mato Grosso: Dourados (VILELA *et al.*, 1971). Santa Catarina: Blumenau and Timbó (ARAUJO *et al.*, 1996). Paraná: Foz do Iguaçu (ZIMMERMANN *et al.*, 2015b).

Remarks. The synonym list presented here includes the original description and the works mentioning Brazil. The complete list is available in SCHMALFUSS (2003).

Distribution. Circumtropical. In Brazil, this species is recorded from the states of Pará, Bahia, Mato Grosso, Mato Grosso do Sul, Espírito Santo, Paraná and Santa Catarina.

Diploexochus Brandt, 1833

***Diploexochus echinatus* Brandt, 1833**

(Figs 98-122)

Diploexochus echinatus BRANDT, 1833:192, pl. IV, figs 20, 21; MILNE-EDWARDS, 1840:180; BUDDÉ-LUND, 1909:54; RICHARDSON, 1912:479;

ARCANGELI, 1934:92, 1957:101; VAN NAME, 1936:398, figs 241-243; LEMONS DE CASTRO, 1967:322; SOUZA-KURY, 1998:6532; LEISTIKOW & WÄGELE, 1999:44; SCHMALFUSS, 2003:90.

Armadillo echinatus; BUDDÉ-LUND, 1879:7; 1885:26, 1904:104, pl. IX figs 35-37.

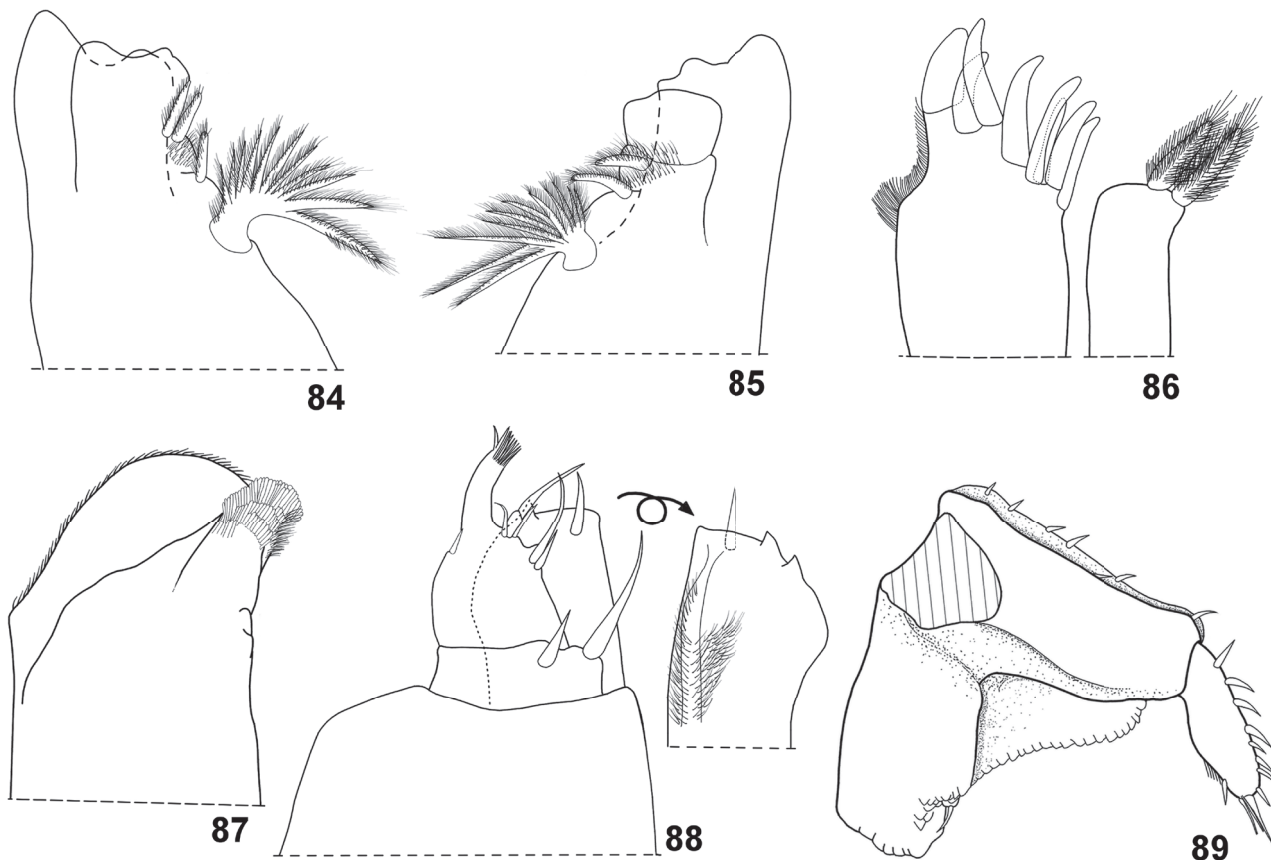
Cubaris echinatus; PEARSE, 1917:3.

Cubaris gaigei PEARSE, 1917:2, fig. 1; VAN NAME, 1925:467.

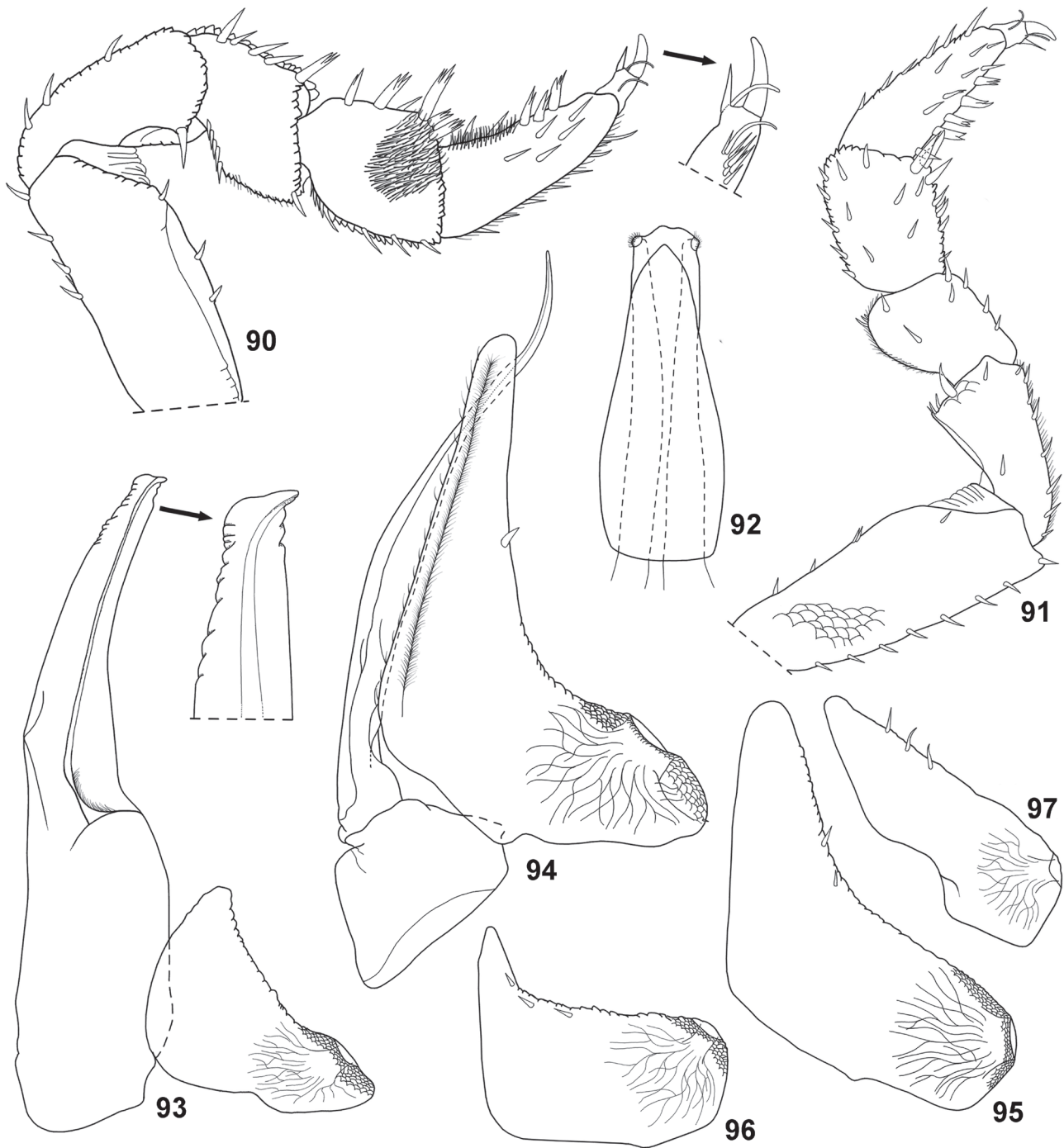
Material examined. FRENCH GUIANA: ♂, 3♀, RN Nouragues, Saint Pararé, 4.VII.2010, S. E. A. G. col. (MZUF 9653). BRAZIL, **Pará:** 3♂, 3♀, 3 juveniles, FLONA Caxiuanã, 25.VIII.2012, E. G. Cafofo col. (MZUF 9652).

Previous Brazilian records. Pará: Acará and Belém (Ilha do Marajó) (LEMONS DE CASTRO, 1967).

Redescription. Maximum body length: ♂ 9 mm, ♀ 9.5 mm. Color dark brown. Endoantennal conglobation (Fig. 98). Dorsum covered with large triangular and acute tubercles, arranged as follows (Fig. 99): vertex of cephalon with 12 tubercles in three rows; pereonite 1 with 24 tubercles; pereonites 2-6 with 15 tubercles; pereonite 7 with 13 tubercles; pleonites 3 and 4 with one row of four tubercles, pleonite 5 and telson with two paramedian tubercles each. Dorsal surface with short semi-circular scale-setae (Fig. 100). Cephalon (Figs 101-103) with frontal shield prominent, distinctly protruding above vertex; eye with about 20 ommatidia. Pereonites with epimera flattened and directed outwards; pereonite 1 strongly grooved on lateral margin, inner lobe of schisma rounded, slightly extending beyond posterior



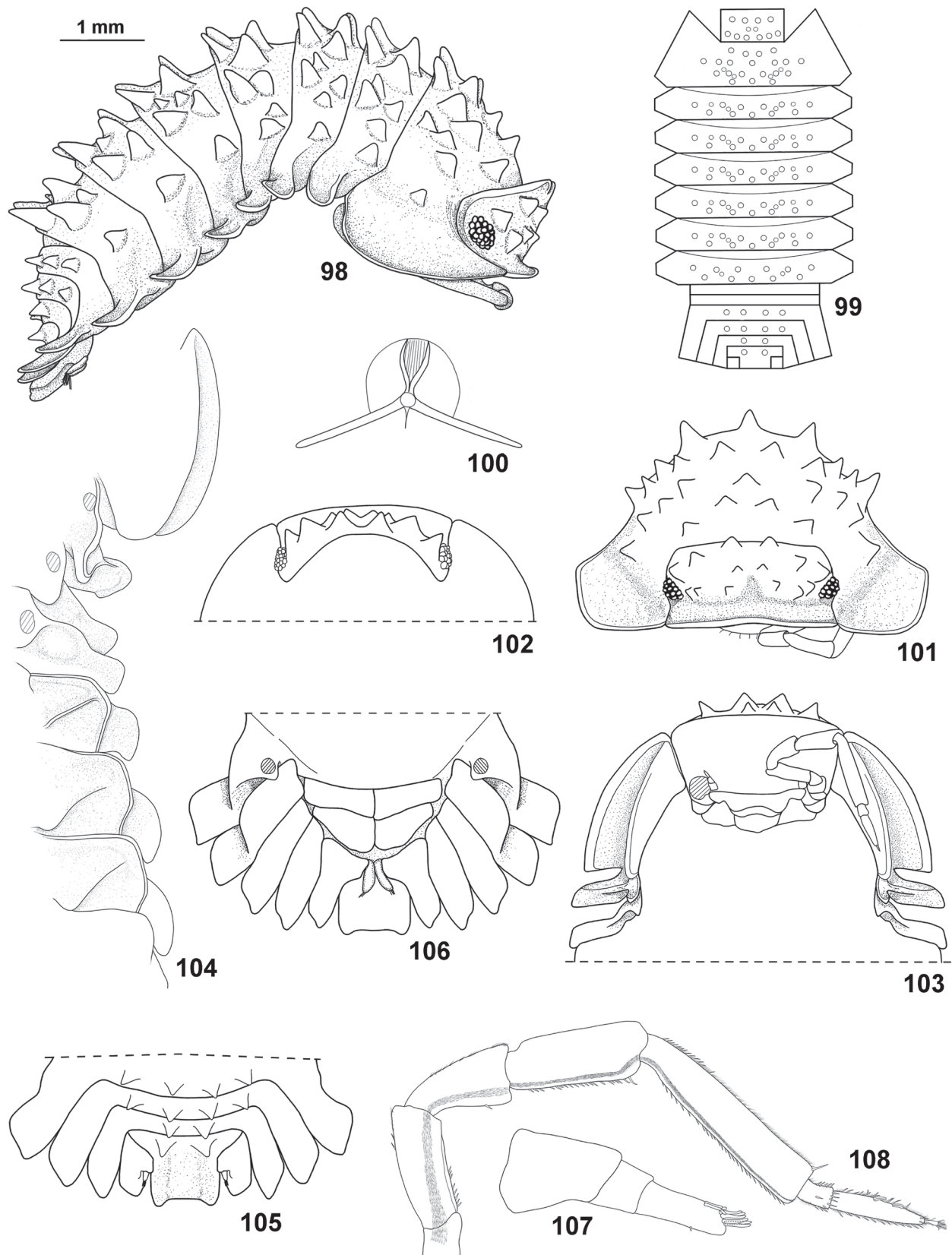
Figs 84-89. *Ctenorillo tuberosus* (Budde-Lund, 1904), ♂: 84, left mandible; 85, right mandible; 86, maxillula; 87, maxilla; 88, maxilliped; 89, uropod.



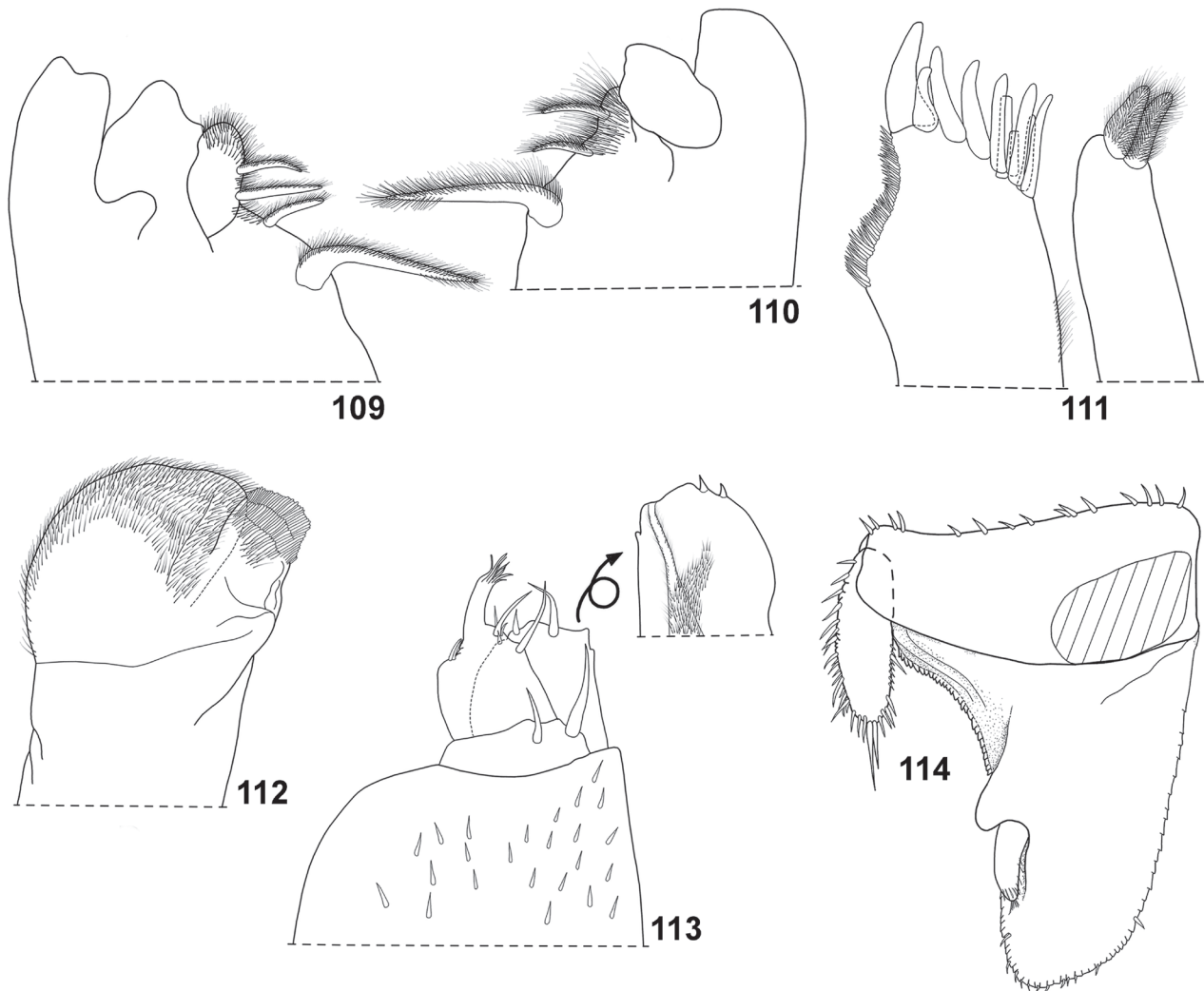
Figs 90-97. *Ctenorillo tuberosus* (Budde-Lund, 1904), ♂: 90, pereopod 1; 91 pereopod 7; 92, genital papilla; 93, pleopod 1; 94, pleopod 2; 95, pleopod 3 exopod; 96, pleopod 4 exopod; 97, pleopod 5 exopod.

margin of outer lobe (Figs 103, 104), pereonite 2 with triangular ventral lobe; pereonite 3 with small rounded ventral lobe; pereonites 5-7 with oblique ventral ridge (Fig. 104). Pleonites 3-5 (Figs 105, 106) with epimera well developed, quadrangular slightly directed outwards. Telson quadrangular, proximal part broader than distal part, dorsum slightly depressed, distal margin concave. Antennula (Fig. 107) of three articles, proximal and distal articles subequal in

length, distal article with many aesthetascs inserted apically and subapically. Antenna (Fig. 108) short, not surpassing rear margin of pereonite 1; flagellum of two articles, distal article about three times as long as first bearing two rows of two aesthetascs. Mandible (Figs 109, 110) with molar penicil simple; left mandibles with 2+1 and right mandible with 1+1 free penicils. Maxillula (Fig. 111) outer branch with 4+6 simple teeth; inner branch with two stout penicils.



Figs 98-108. *Diploexochus echinatus* Brandt, 1833. ♂: 98, adult specimen, lateral view; 99, disposition of dorsal tubercles; 100, dorsal scale-seta; 101, cephalon and pereonite 1, dorsal view; 102, cephalon and pereonites 1, caudal view; 103, cephalon and pereonites 1-3, frontal view; 104, epimera of pereonites 1-7, ventral view; 105, pleonites 3-5, telson and uropods, dorsal view; 106, pleonites 3-5, telson and uropods, ventral view; 107, antennula; 108, antenna.



Figs 109-114. *Diploexochus echinatus* Brandt, 1833, ♂: 109, left mandible; 110, right mandible; 111, maxillula; 112, maxilla; 113, maxilliped; 114, uropod.

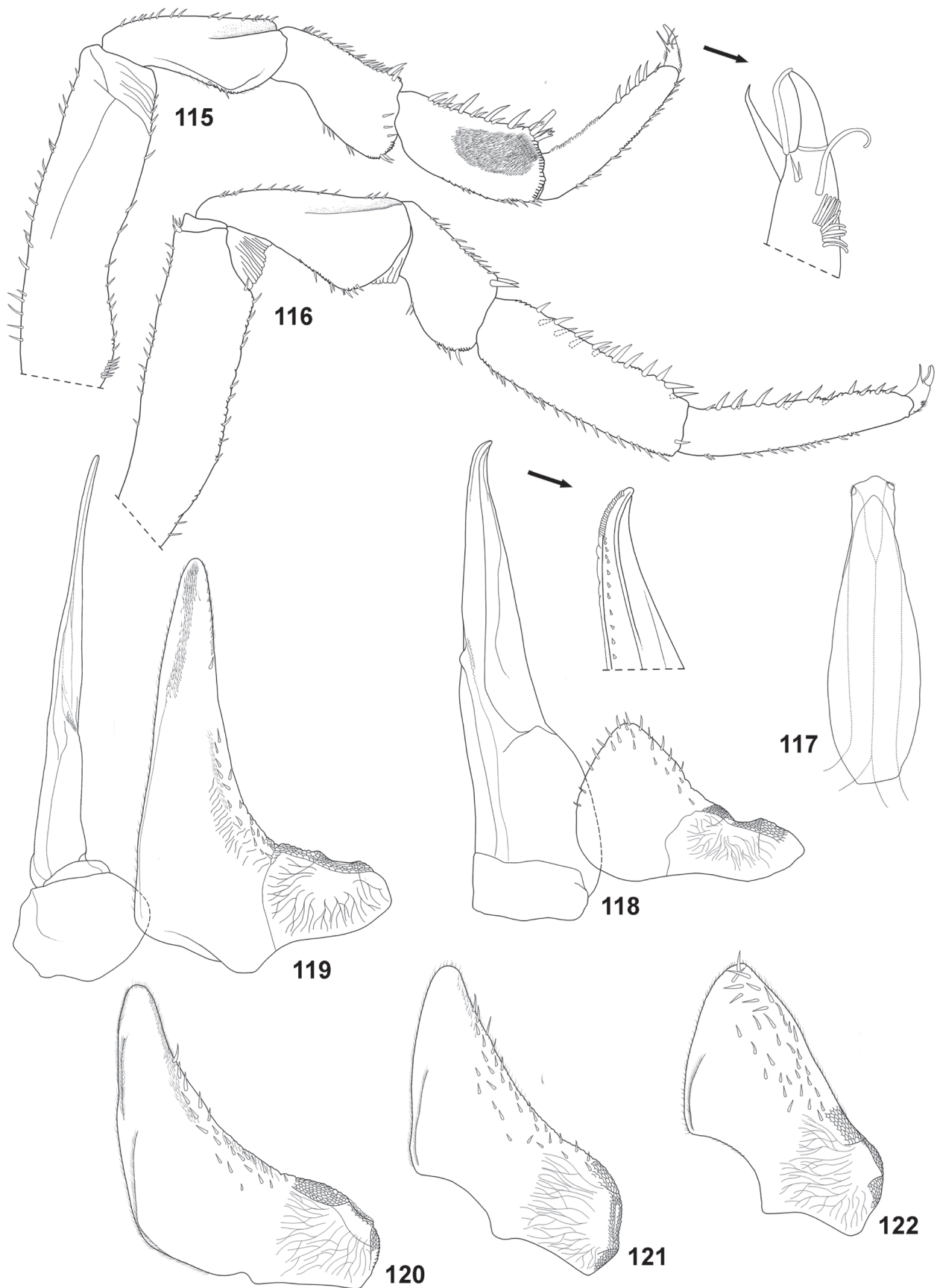
Maxilla (Fig. 112) bilobate, outer lobe three times as wide as inner lobe, covered with thin setae, inner lobe covered with thick setae. Maxilliped (Fig. 113) endite with medial seta overpassing distal margin; distal margin slightly rounded with two short triangular setae; palp with two setae on basal article. Pleopods 1–5 with monospiracular respiratory structures. Uropod (Fig. 114) protopod flattened, enlarged on basal part, distal part subrectangular, medial margin slightly concave; exopod short inserted dorsally near medial margin below distinct lobe.

Male: pereopods 1 and 7 (Figs 115, 116) with no particular modifications. Genital papilla as in Fig. 117. Pleopod 1 (Fig. 118) exopod small, triangular, wider than long, outer and inner margin with many setae; endopod about three times as long as exopod, distal part slightly bent outwards. Pleopod 2 (Fig. 119) exopod triangular, outer margin strongly concave bearing many setae; endopod slightly longer than exopod. Pleopod 3–5 exopods as in Fig. 120-122.

Remarks. *Diploexochus* was erected by BRANDT (1833) to allocate *D. echinatus* from Brazil. To date, the genus includes with certainty only the type-species (SCHMALFUSS, 2003).

Distribution. Guyana, French Guiana, Trinidad and Brazil (state of Pará).

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Figs 115-122. *Diploexochus echinatus* Brandt, 1833, ♂: 115, pereopod 1; 116, pereopod 7; 117, genital papilla; 118, pleopod 1; 119, pleopod 2; 120, pleopod 3 exopod; 121, pleopod 4 exopod; 122, pleopod 5 exopod.

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