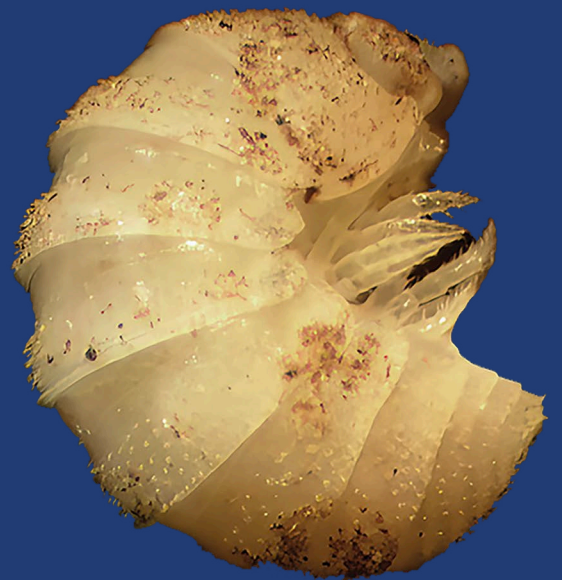
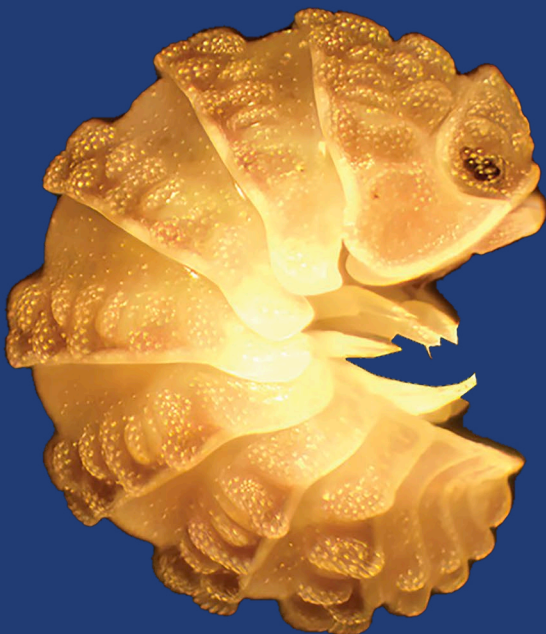


Terrestrial isopods (Isopoda, Oniscidea)  
of São Tomé Island, with the description  
of two new Armadillidae Brandt, 1831 species

Julio CIFUENTES & Luis P. DA SILVA



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*Ctenorillo atlanticus* n. sp. and *Gabunillo thomensis* n. sp., habitus.

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# Terrestrial isopods (Isopoda, Oniscidea) of São Tomé Island, with the description of two new Armadillidae Brandt, 1831 species

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## ABSTRACT

The island of São Tomé is located in the Gulf of Guinea on the western coast of Africa and is one of the world's biodiversity hotspots. It is known by its large number of endemic vertebrate and plant species; however, many arthropod groups are little known including terrestrial isopods (Isopoda, Oniscidea). We studied 121 specimens from 14 species and six families collected in the island of São Tomé. Six species are registered for the first time in the island: *Agnara madagascariensis* (Budde-Lund, 1885); *Ctenorillo bananae* (Van Name, 1920); *Cubaris murina* Brandt, 1833; *Elumoides atlanticus* Ferrara & Schmalzfuss, 1983; *Trichorhina kribensis* Ferrara & Schmalzfuss, 1983 and *Nagurus cristatus* (Dollfus, 1889). Additionally, we describe two new Armadillidae Brandt, 1831 species: *Ctenorillo atlanticus* n. sp. and *Gabunillo thomensis* n. sp. Currently, 17 species of this group are known from the island of São Tome, four of which are only known from this island.

**KEY WORDS**  
*Ctenorillo*,  
*Gabunillo*,  
Gulf of Guinea,  
São Tomé and Príncipe,  
new records,  
new species.

## RÉSUMÉ

*Isopodes terrestres (Isopoda, Oniscidea) de l'île de São Tomé, avec la description de deux nouvelles espèces d'Armadillidae Brandt, 1831.*

L'île de São Tomé est située dans le golfe de Guinée sur la côte ouest de l'Afrique et constitue l'un des « hotspots » de la biodiversité mondiale. Elle est connue pour son grand nombre d'espèces endémiques, aussi bien des vertébrés que des plantes; cependant, de nombreux groupes d'arthropodes sont peu connus, y compris les isopodes terrestres (Isopoda, Oniscidea). Nous avons étudié 121 spécimens de 14 espèces et six familles, collectés dans l'île de São Tomé. Six espèces sont signalées pour la première

**MOTS CLÉS**  
*Ctenorillo*,  
*Gabunillo*,  
golfe de Guinée,  
São Tomé et Príncipe,  
signalisations nouvelles,  
espèces nouvelles.

fois sur l'île: *Agnara madagascariensis* (Budde-Lund, 1885); *Ctenorillo bananae* (Van Name, 1920); *Cubaris murina* Brandt, 1833; *Elumoides atlanticus* Ferrara & Schmalfuss, 1983; *Trichorhina kribensis* Ferrara & Schmalfuss, 1983 et *Nagurus cristatus* (Dollfus, 1889). De plus, nous décrivons deux nouvelles espèces d'Armadillidae Brandt, 1831: *Ctenorillo atlanticus* n. sp. et *Gabunillo thomensis* n. sp. Actuellement, 17 espèces de ce groupe sont connues de l'île de São Tomé, dont quatre ne sont connues que de cette île.

## INTRODUCTION

The Democratic Republic of São Tomé and Príncipe is an insular country composed by the island of São Tomé and the island of Príncipe together with some rocky islets. São Tomé is the middle island of the three oceanic islands in the Gulf of the Guinea. These are part of the Cameroon volcanic mountain line that extends 1600 km in a north-easterly direction through part of the African continent, and has a fourth island, Bioko, in the continental shelf (Ceríaco *et al.* 2022). Bioko was connected to the Cameroon coast by a land bridge during the sea retraction during the last Quaternary glaciation and was connected for the last time approximately 11 000 years ago (Lambeck & Chappell 2001). The age of the oceanic islands is estimated to be 31, 15 and six million of years for Príncipe, São Tomé and Annobón, respectively (Lopes 2020). They were never physically connected to the mainland since their formation, not allowing their natural colonization by land (Ceríaco *et al.* 2022). This means that terrestrial isopods had to be transported to the islands, either by natural or anthropogenic means. These islands have a large number of endemic species of several taxonomic groups (Jones 1994; Ceríaco *et al.* 2022), but little is known from several arthropod taxa, including isopods. Isopods from the island of Annobón, as well as from close continental locations (Bioko and Mbini) deposited in the Museo Nacional de Ciencias Naturales, Madrid, collected during expeditions from the early 20<sup>th</sup> century, were recently studied (Cifuentes 2021), but the knowledge of the terrestrial isopods that occur in the islands of the Democratic Republic of São Tomé and Príncipe is very scarce.

In this work we aim to contribute to the knowledge on the biodiversity of terrestrial isopods of the island of São Tomé, the largest oceanic island of the Gulf of Guinea, and compare it with the known species composition of the other islands in the Gulf of the Guinea and nearby continental areas.

## MATERIAL AND METHODS

The island of São Tomé is distanced more than 230 km off the African continent and is located just north of the Equator. It is mostly covered by basaltic lavas, some phonolite and pyroclasts, and alluvial and flood deposits, with the majority of the surface being less than 1 Ma old (Caldeira & Munhá 2002; Barfod & Fitton 2014). The island is composed by mountains and steep slopes reaching 2024 m a.s.l., with some flatter areas in the

northeast (Ceríaco *et al.* 2022). Climate in the island is classified as Tropical monsoon (Am) and Savannah with dry winter (Aw) (Beck *et al.* 2018), with mean temperatures slightly higher than 25°C at the sea level, and slightly lower than 15°C at the highest altitudes (Ceríaco *et al.* 2022). Precipitation is highly variable in São Tomé, with a short dry season of a few weeks that occurs somewhere between mid-December and mid-March, and a longer dry season from June to mid-September, with annual averages greater than 7000 mm in the southwest, decreasing to less than 1000 mm in northeast (Lains e Silva 1958). The differences in precipitation, humidity and cloud cover create different climatic zones, from the southern super-humid region to semi-arid in the flatter areas of the north (Ceríaco *et al.* 2022). Before its human occupation in the late 15<sup>th</sup> century, most of the island was covered by tropical humid forest, but almost three-quarters of the native vegetation was transformed due to human activity, particularly in the 19<sup>th</sup> and 20<sup>th</sup> centuries, and potentially native forest are currently only present in rugged areas of difficult accessibility (Soares *et al.* 2020; Ceríaco *et al.* 2022). Besides the potential natural forest, currently around 11% of the island have open vegetation habitats, including horticulture crops (in mountain areas) and savannah-like habitats (in lower altitudes in the North of the island); almost 3% is covered by urban areas and similar area is covered by monoculture palm plantations; 2% are roads and paths; 28% is secondary forest, i.e. transformed forests that recovered in the last decades and have a structure similar to primary forest, but usually with notorious differences in species composition; and finally 26% is shade forest, mostly of coffee and cocoa plantations (Ceríaco *et al.* 2022). The human influence is notorious in the island and for example more than a quarter of the plant taxa is considered to be human introduced (Figueiredo *et al.* 2011).

We performed a directed sampling effort by searching the target group among litter, below trunks and other dead wood sources, as well as below rocks. The sampling occurred in May 2022 at 21 distinct sites across the island of São Tomé (Fig. 1), although it was not possible to sample the entire island, nor potential areas with native forest due to logistical constraints. We recorded GPS coordinates for all the specimens collected. Identifications were conducted with the aid of specialized bibliography (Silvestri 1918; Van Name 1920, 1936; Arcangeli 1950; Schmölzer 1974; Ferrara & Schmalfuss 1976, 1983, 1985; Schmalfuss & Ferrara 1978, 1982, 1983; Taiti & Ferrara 1987; Taiti 2018). Considered type species were the ones described in Schmidt & Leistikow (2004). As several species of tropical regions are not well known, and in many cases, they

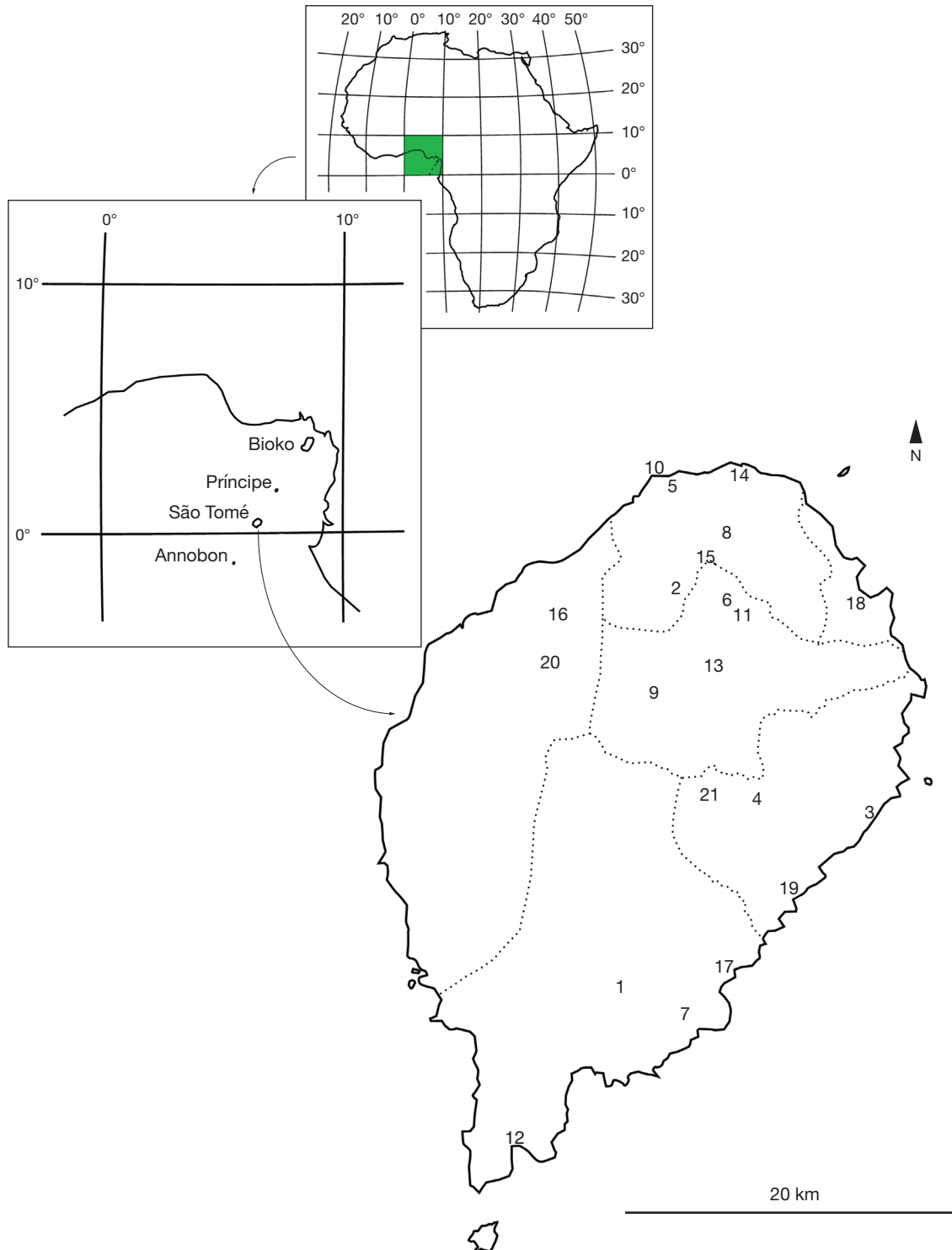


FIG. 1. — Location of São Tomé in the Gulf of Guinea and sampling sites within São Tomé island: 1, Agripalma; 2, Água Coimbra; 3, Água Izé; 4, Bernardo Faro; 5, path to Lagoa Azul; 6, CIAT (Centro de Investigação Agronómica e Tecnológica); 7, Dona Augusta; 8, Sebastião dos Anjos do Rosário – “Sum Mé Xinhô” secondary school; 9, Bom Sucesso botanical garden; 10, Lagoa Azul; 11, Madalena; 12, Malanza; 13, Monte Café; 14, Praia dos Governadores; 15, Roça Agostinho Neto; 16, Roça Costa Santos; 17, Roça de São João de Angolares; 18, São Tomé (city); 19, Secador da Colonia Açoriana; 20, Trilho dos Tuneis; 21, Vale Formoso.

are only known from their original description, we provide photos of all the species detected in this work to facilitate their identification. These photos were taken with a digital camera MikroCam Sp 3.1. The drawings were prepared with the graphic editor InKscape (<https://inkscape.org/>). The holotypes of the

two described species, along with specimens of other species found, are deposited at Museo Nacional de Ciencias Naturales de Madrid (MNCN). The remaining specimens, including paratypes are deposited at the InBio Barcoding Initiative (IBI, code start with OST), from Centro de Investigação em Biodi-

versidade e Recursos Genéticos (CIBIO), Campus de Vairão, University of Porto, Muséum national d'Histoire naturelle (MNHN), Paris, and the collection of one of the authors (JC).

ABBREVIATIONS AND SYMBOL

*Institutions*

CIAT Centro de Investigação Agronómica e Tecnológica, São Tomé;  
 CIBIO Centro de Investigação em Biodiversidade e Recursos Genéticos, Vairão;  
 IBI InBio Barcoding Initiative, Vairão;  
 MNCN Museo Nacional de Ciencias Naturales de Madrid;  
 MNHN Muséum national d'Histoire naturelle, Paris.

*Personal collection*

Coll. JC Collection of Julio Cifuentes, Madrid.

*Symbol*

\* first record in São Tomé.

RESULTS

Family AGNARIDAE Schmidt, 2003

Genus *Agnara* Budde-Lund, 1908

*Agnara* Budde-Lund, 1908: 286.

TYPE SPECIES. — *Metoponorthus madagascariensis* Budde-Lund, 1885.

*Agnara madagascariensis*\* (Budde-Lund, 1885)  
 (Fig. 2A)

*Metoponorthus madagascariensis* Budde-Lund, 1885: 189.

*Agnara madagascariensis* – Budde-Lund 1908: 286.

MATERIAL EXAMINED. — **Democratic Republic of São Tomé and Príncipe** • 1 ♀; São Tomé; 0°21'25.6"N, 6°43'12.0"E; 8.V.2022; L.P. da Silva leg.; OST004; IBI • 1 ♂; São Tomé; 0°21'26.6"N, 6°43'13.1"E; 10.V.2022; L.P. da Silva leg.; MNCN 20.04/14247 • 1 ♂; São Tomé; 0°21'26.6"N, 6°43'12.7"E; 11.V.2022; L.P. da Silva leg.; OST023a; IBI • 1 ♂; São Tomé; 0°21'26.6"N, 6°43'12.7"E; 11.V.2022; L.P. da Silva leg.; Coll. JC691.

REMARKS

This species was described by Budde-Lund (1885) as *Metoponorthus madagascariensis* and latter placed by the same author (1908) in the genus *Porcellio* Latreille, 1804 and subgenus *Agnara* established by him. Schmalfuss & Ferrara (1978) described *Protracheoniscus inexpectatus* from 28 specimens captured in Guinea-Bissau, being this species synonymous with the previous (Schmalfuss 2003). It is recorded for the first time for São Tomé.

DISTRIBUTION

*Agnara madagascariensis* is known from Guinea-Bissau, Senegal, Madagascar, Arabia, south China, Taiwan, Ascensión

island, Colombia and Venezuela (Budde-Lund 1885, 1908; Schmalfuss & Ferrara 1978; Taiti & Ferrara 1991; Schmalfuss 2003; López-Orozco *et al.* 2022).

Family ARMADILLIDAE Brandt, 1831

Genus *Ctenorillo* Verhoeff, 1942

*Ctenorillo* Verhoeff, 1942: 23.

TYPE SPECIES. — *Ctenorillo buddelundi* Verhoeff, 1942 (synonym: *Cubaris regulus* Van Name, 1920).

*Ctenorillo bananae*\* (Van Name, 1920)  
 (Fig. 2B)

*Cubaris bananae* Van Name, 1920: 97.

*Ctenorillo bananae* – Taiti *et al.* 1998: 299.

MATERIAL EXAMINED. — **Democratic Republic of São Tomé and Príncipe** • 2 ♂; Praia dos Governadores; 0°24'43.9"N, 6°39'41.8"E; 17.V.2022; L.P. da Silva leg.; OST044a; IBI • 1 ♂; Praia dos Governadores; 0°24'43.9"N, 6°39'41.8"E; 17.V.2022; L.P. da Silva leg.; Coll. JC695 • 2 ♀; Praia dos Governadores; 0°24'43.9"N, 6°39'41.8"E; 17.V.2022; L.P. da Silva leg.; OST044b; IBI • 1 ♂; Praia dos Governadores; 0°24'43.9"N, 6°39'42.1"E; 17.V.2022; L.P. da Silva leg.; MNCN 20.04/14248 • 1 ♀; Praia dos Governadores; 0°24'43.9"N, 6°39'42.1"E; 17.V.2022; L.P. da Silva leg.; OST048b; MNHN-IU-2022-1621.

REMARKS

The species was described by Van Name (1920) as *Cubaris bananae* from Banana and Zambi in the actual Democratic Republic of Congo. It is easily recognized from other species in the genus by its weak granulation only somewhat more marked in the anterior pereonites. It is known from Angola, Democratic Republic of Congo and Cameroon (Ferrara & Schmalfuss 1983; Schmalfuss 2003). It is recorded for the first time for São Tomé.

*Ctenorillo atlanticus* n. sp.  
 (Figs 2C; 3-6)

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TYPE MATERIAL. — **Holotype**. **Democratic Republic of São Tomé and Príncipe** • 1 ♂; São Tomé; 0°20'30.1"N, 6°44'12.6"E; 9.V.2022; L.P. da Silva leg.; MNCN 20.04/20603.

**Paratype**. **Democratic Republic of São Tomé and Príncipe** • 1 ♂; Praia dos Governadores; 0°24'44.1"N, 6°39'41.7"E; 17.V.2022; L.P. da Silva leg.; Coll. JC673 • 1 ♀; Praia dos Governadores; 0°24'44.1"N, 6°39'41.7"E; 17.V.2022; L.P. da Silva leg.; OST045b; IBI • 1 ♂; São Tomé; 0°20'29.9"N, 6°44'12.5"E; L.P. da Silva leg.; OST010a; IBI • 1 ♀; São Tomé; 0°20'29.9"N, 6°44'12.5"E; L.P. da Silva leg.; OST010b; MNHN-IU-2022-1620 • 1 juvenile; São Tomé; 0°20'29.9"N, 6°44'12.5"E; L.P. da Silva leg.; OST010c; IBI.

ETYMOLOGY. — The specific name refers to the fact that it lives on an island bathed by this ocean.

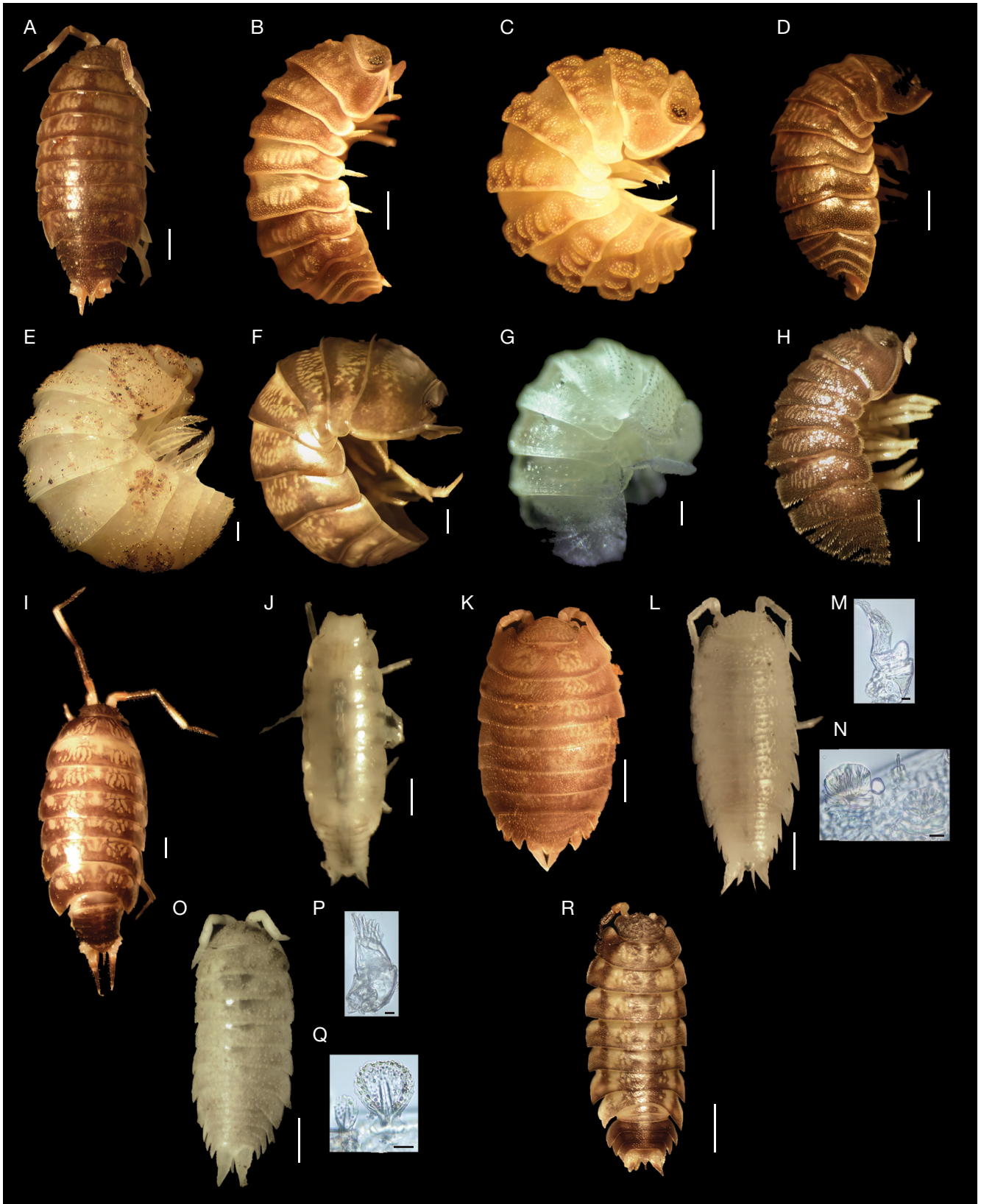


FIG. 2. — **A**, *Agnara madagascariensis* (Budde-Lund, 1885), habitus; **B**, *Ctenorillo bananae* (Van Name, 1920), habitus; **C**, *Ctenorillo atlanticus* n. sp., habitus; **D**, *Cubaris murina* Brandt, 1833, habitus; **E**, *Gabunillo thomensis* n. sp., habitus; **F**, *Venezillo crassus* (Budde-Lund, 1904), habitus; **G**, *Elumoides atlanticus* Ferrara & Schmalzfuss, 1983, habitus; **H**, *Eubelum asperius* Van Name, 1920, habitus; **I**, *Burmoniscus kohleri* (Schmalzfuss & Ferrara, 1978), habitus; **J**, *Congophiloscia saothomensis* Schmalzfuss & Ferrara, 1978, habitus; **K**, *Niambia atracheata* (Schmalzfuss & Ferrara, 1978), habitus; **L-N**, *Trichorhina hospes* Silvestri, 1918, habitus (**L**), antennula (**M**), scale-setae (**N**); **O-Q**, *Trichorhina kribensis* Ferrara & Schmalzfuss, 1983, habitus (**O**), antennula (**P**), scale-setae (**Q**); **R**, *Nagurus cristatus* (Dollfus, 1889), habitus. Scale bars: A-C, I, J, L, O, 0.5 mm; D, F, H, K, R, 1 mm; E, G, 0.1 mm; M, N, P, Q, 0.01 mm.

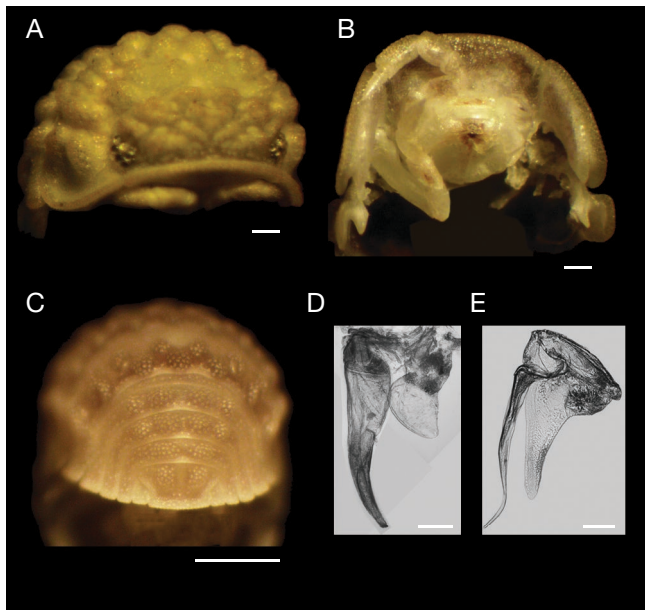


FIG. 3. — *Ctenorillo atlanticus* n. sp.: **A**, vertex and first pereonite; **B**, cephalon, first and second pereonites; **C**, pleon, telson and uropods; **D**, first male pleopod; **E**, second male pleopod. Scale bars: A, B, D, E, 0.1 mm; C, 0.5 mm.

**ECOLOGY.** — *Ctenorillo atlanticus* n. sp. is an epigeal species. The specimens from São Tomé were found beneath dead wood in a city park, while those from Praia dos Governadores were found underneath the bark of a fallen tree on the beach.

**DESCRIPTION**

*Body*

Maximum body length 3 mm in a female and 3.5 mm in a male. General coloration dark purplish brown, with lighter muscle insertions and pleuroepimers (Fig. 2C).

*Integumentary characters (Figs 2C; 3A, C; 4A-D)*

Integument with circular depressions and with large ribs and tubercles. Cephalon with six rows of tubercles, more notorious towards the posterior and central region. First pereonite with three rows, formed respectively by four, six and seven tubercles that form more or less developed ribs, in addition to two other large tubercles partially fused at the limit of the pleuroepimer; from tergites II to VI with two alternate rows of tubercles, also forming ribs more or less developed, numbering three + three in the anterior row and three + one + three in the posterior row, plus another large rib at the limit of the pleuroepimer which moves towards the posterior edge of the tergite in the successive segments; in tergite VII with two alternate rows of tubercles, formed by two + two in the anterior row and two + one + two in the posterior, in addition to the ribs in the pleuroepimer edge. Pleonites III and IV with two + two strong tubercles. Pleonite V and the base of the telson with two large paramedian tubercles. Scale-setae very small and with a more or less semi-circular scale (Fig. 4E).

*Somatic characters (Figs 2C; 3A-C; 4B-F)*

Strongly convex body, pleuroepimers almost vertical towards the ventral side, neopleurons and telson with a slight lateral expansion. Ocular apparatus with eight ommatidia.

**Cephalon.** Frontal shield with a protuberance slightly above the vertex, slightly convex at its edge and curved up.

**Pereon.** Lateral edge of pleuroepimer I very little raised, and separated from the rest of the tergite by a depression; very acute anterior angle; posterior angle with a schisma with two differentiated lobes, the anterior lobe with a truncated posterior margin, the posterior lobe with a rounded shape and protruding in relation to the anterior lobe in a lateral view. Epimera from pereonite II with a triangular inner lobe, much shorter than the outer lobe. Pleuroepimers II to VII quadrangular.

**Pleon.** Neopleurons slightly extended.

**Telson.** Hourglass shaped, with the distal part narrower than the basal, the rear edge slightly convex and extended, and with marked angles.

*Appendages (Fig. 5A-G)*

Mouth apparatus with mandibles with molar penicil formed by several feathered setae; left mandible with two + one free penicils and right mandible with one + one; maxillule with four + six teeth; maxilliped endite with a large subapical seta and two short triangular setae. Antennula with three segments, the second much smaller than the other two, and the third with a group of aesthetascs at the tip. Antenna short and stout; the first flagellum segment with half of the length of the second, the second flagellum with a group of short aesthetascs. Uropod with the endopod reaching half the length of the protopod; protopod with a trapezoidal shape and a concave internal edge; exopod greatly reduced, on the dorsal side of the protopod and near the inner margin (Fig. 4D). Pereopod I with several hyaline scales in the ventral side in both sexes. Monospiracular respiratory structure is present in all of the pleopods, and opening near the base of the outer edge.

*Male sexual characters (Figs 3D, E; 6A-I)*

Pereopods I and VII without sexual differentiation. Pleopod I with the endopod curved in its distal third and a dilation at the tip; triangular exopod, with a very long internal side and with a pointed termination. Pleopod II with a very long endopod and with a broad tip at the end; triangular exopod, with a very large internal side. Pleopods III to V as shown in Figure 6G-I.

**REMARKS**

The genus *Ctenorillo* Verhoeff, 1942 currently comprises 15 species: *C. ausseli* (Dollfus, 1893) from Spain (Canary Islands); *C. bananae* (Van Name, 1920) from Angola, Cameroon and Congo; *C. dazai* Carpio-Díaz, López-Orozco & Campos-Filho, 2018 from Colombia; *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* Schmölzer, 1974 from Tanzania and



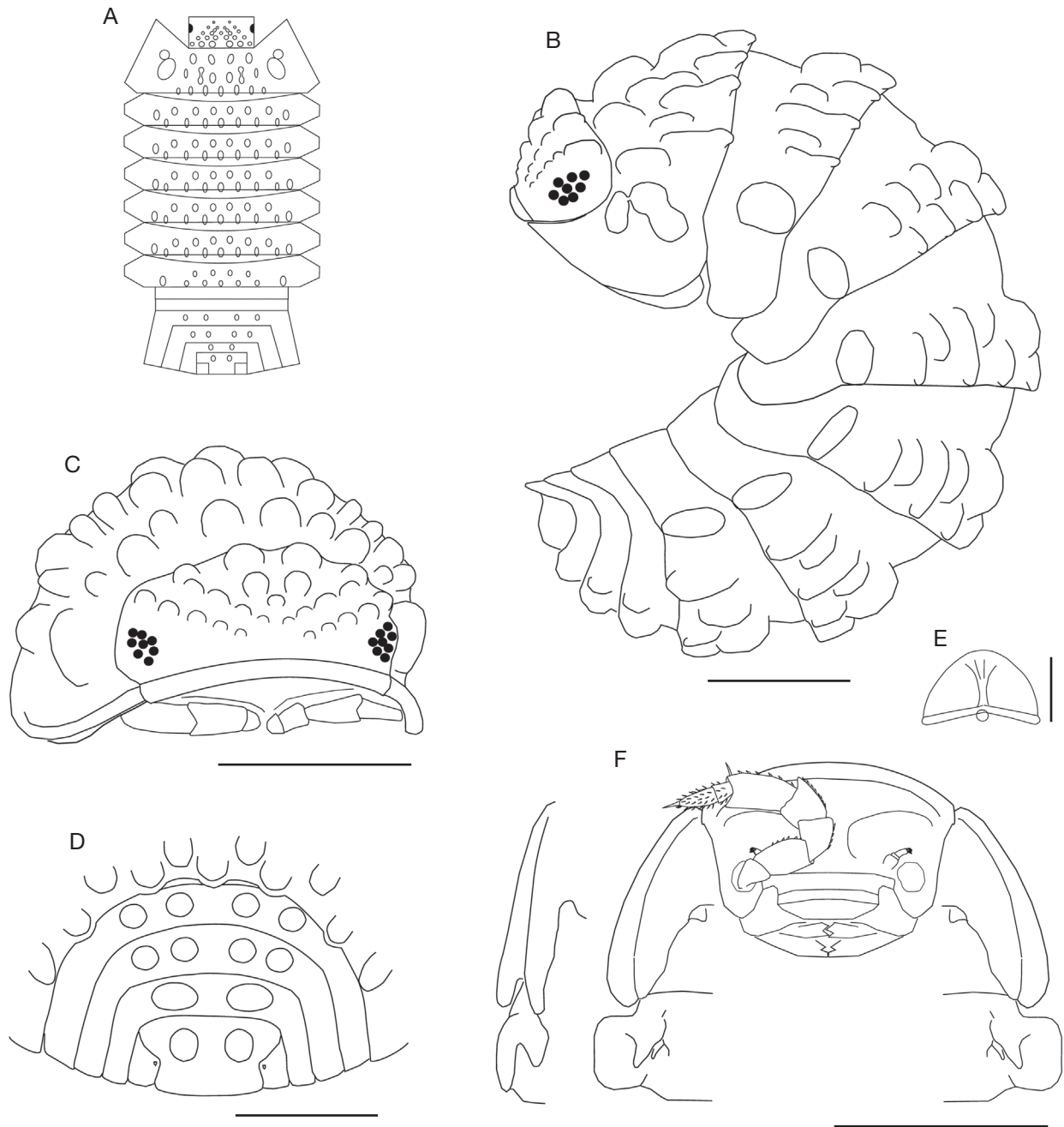


FIG. 4. — *Ctenorillo atlanticus* n. sp.: **A**, disposition of tubercles; **B**, habitus, lateral view; **C**, cephalon and first pereonite; **D**, pleon and telson; **E**, scale-setae; **F**, cephalon, pereonites I and II, ventral view. Scale bars: B-D, F, 0.5 mm; E, 0.01 mm.

Uganda; *C. legai* (Arcangeli, 1941) from Ethiopia; *C. meyeri* Taiti, 2018 from South Africa; *C. mineri* (Van Name, 1936) from Guyana and Venezuela; *C. parituberculatus* (Taiti & Ferrara, 1987) from Malawi; *C. regulus* (Van Name, 1920) from Somalia and Zaire; *C. strinatii* (Schmalfuss & Ferrara, 1983) from Congo; and *C. tuberosus* (Budde-Lund, 1904) from Brazil (Dollfus 1893; Van Name 1920, 1936; Paulian de Félice 1941; Verhoeff 1942; Schmölzer 1974; Schmalfuss & Ferrara 1983; Taiti & Ferrara 1987; Schmalfuss 2003; Campos-Filho *et al.* 2014, 2017; Taiti 2018; Carpio-Díaz *et al.* 2018). It is therefore a genus mainly with an African tropical distribution.

The characters present in *Ctenorillo atlanticus* n. sp. place it in this genus of the family Armadillidiidae, characters such as tubercles and elongated bumps in the cephalon, pereon and pleon, the frontal shield of the cephalon protruding above the vertex, the telson in the shape of an hourglass and a very reduced exopod. In this genus, the best character of specific differentiation is the number and arrangement of the tubercles and dorsal protuberances (Campos-Filho *et al.* 2014; Taiti 2018). The presence of large tubercles that form elongated protuberances differentiates *Ctenorillo atlanticus* n. sp. from *C. bananae* and

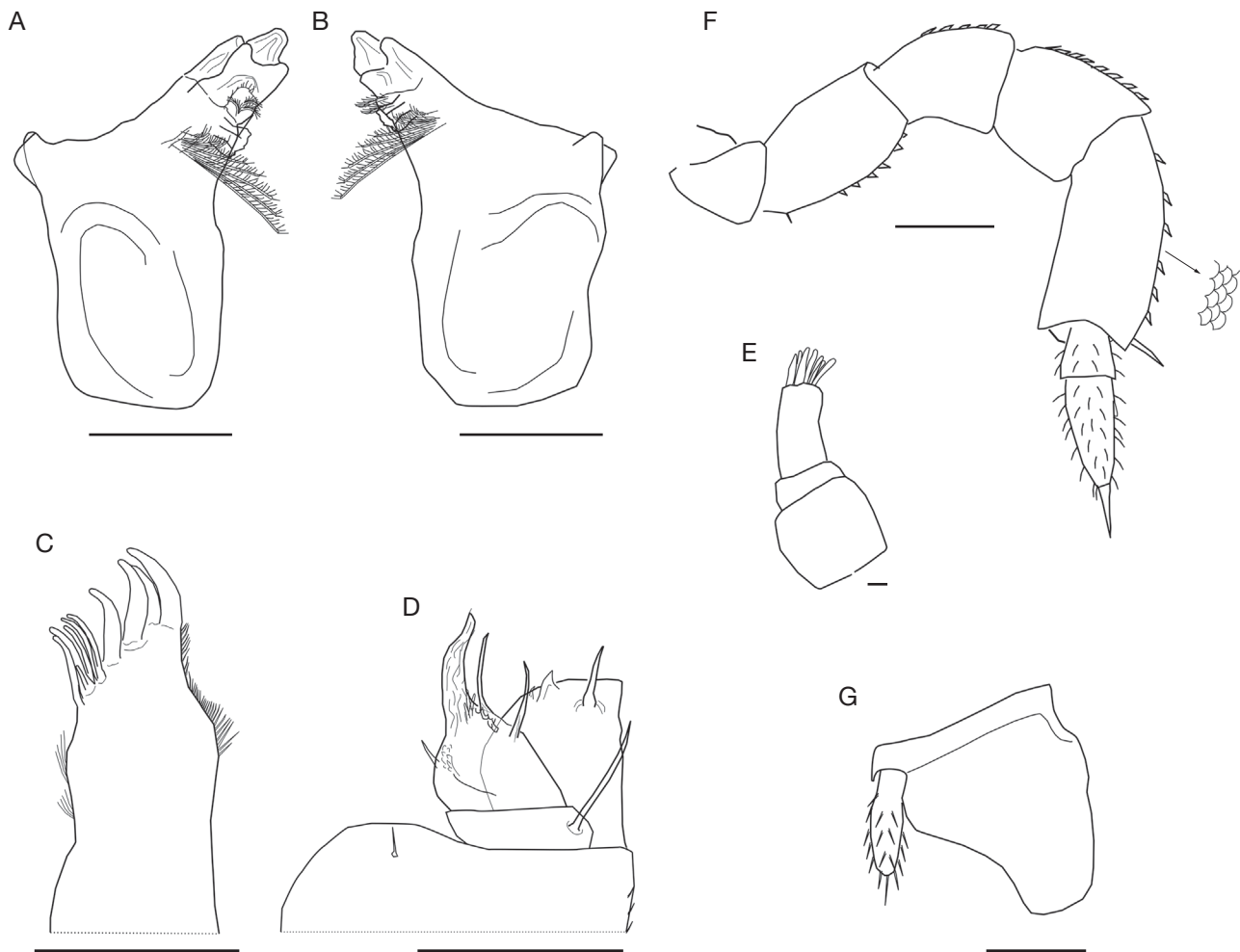


FIG. 5. — *Ctenorillo atlanticus* n. sp.: **A**, left mandible; **B**, right mandible; **C**, maxillule; **D**, maxilliped; **E**, antennula; **F**, antenna with detail of scales; **G**, uropod, ventral view. Scale bars: A-D, F, G, 0.1 mm; E, 0.01 mm.

*C. kenyensis* with weak tubercles, and from *C. ausseli* with conical tubercles. Out of the remaining twelve species, only *C. fagei*, *C. gabunensis*, *C. legai* and *C. tuberosus* have the same number of tubercles in the pleon (four in the III; four in the IV and two in the V) and in the telson (two) as *Ctenorillo atlanticus* n. sp. However, *C. legai* and *C. tuberosus* have a large number of tubercles on the pereon compared to the smaller number in *Ctenorillo atlanticus* n. sp. Additionally, *Ctenorillo atlanticus* n. sp. differs from *C. fagei* and *C. gabunensis* in the number of rows and tubercles on the cephalon and pereon.

#### Genus *Cubaris* Brandt, 1833

*Cubaris* Brandt, 1833: 189.

TYPE SPECIES. — *Cubaris murina* Brandt, 1833.

#### *Cubaris murina*\* Brandt, 1833 (Fig. 2D)

*Cubaris murina* Brandt, 1833: 190.

MATERIAL EXAMINED. — Democratic Republic of São Tomé and Príncipe • 2 ♀; Madalena; 0°19'52.7"N, 6°39'22.0"E; 10.V.2022; L.P. da Silva leg.; OST021; IBI • 1 ♀; São Tomé 0°21'26.3"N, 6°43'12.4"E; 8.V.2022; L.P. da Silva leg.; OST001; IBI • 1 ♀; São Tomé; 0°21'26.3"N, 6°43'11.6"E; 8.V.2022; L.P. da Silva leg.; MNCN 20.04/14250 • 1 ♂; São Tomé; 0°21'25.9"N, 6°43'12.0"E; 8.V.2022; L.P. da Silva leg.; Coll. JC688 • 1 ♀; São Tomé; 0°21'25.6"N, 6°43'12.0"E; 9.V.2022; L.P. da Silva leg.; OST005; MNHN-IU-2022-1622.

#### REMARKS

The species is native from India (Van Name 1936) with a current pantropical distribution (Schmalzfuss 2003). It is recorded for the first time for São Tomé.

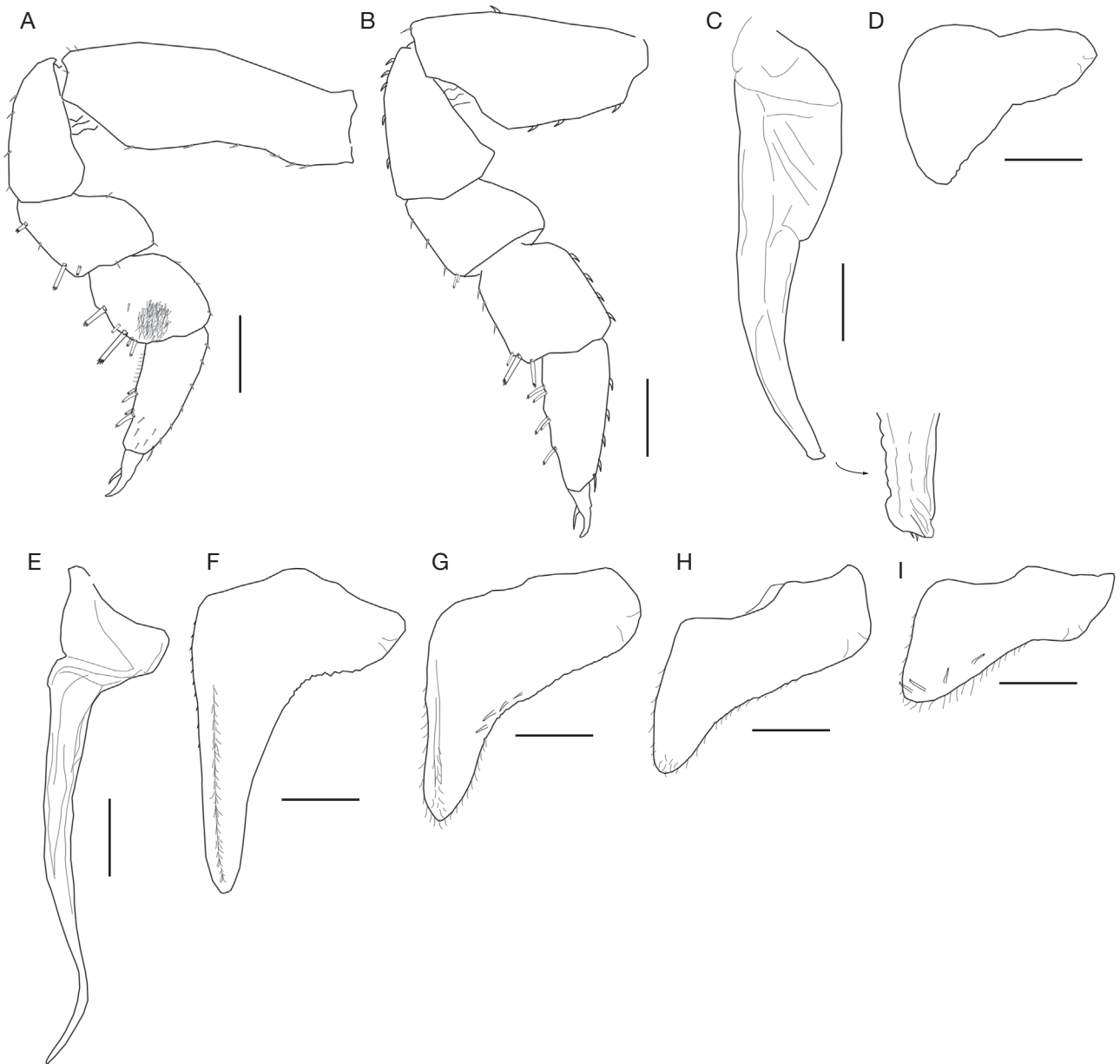


FIG. 6. — *Ctenorillo atlanticus* n. sp.: **A**, male pereopod I; **B**, male pereopod VII; **C**, male pleopod I, endopod; **D**, male pleopod I, exopod; **E**, male pleopod II, endopod; **F**, male pleopod II, exopod; **G**, male pleopod III, exopod; **H**, male pleopod IV, exopod; **I**, male pleopod V, exopod. Scale bars: 0.1 mm.

Genus *Feadillo* Schmalzfuss & Ferrara, 1983

*Feadillo* Schmalzfuss & Ferrara, 1983: 123.

TYPE SPECIES. — *Feadillo principensis* Schmalzfuss & Ferrara, 1983.

*Feadillo saotomensis* Schmalzfuss & Ferrara, 1983

*Feadillo saotomensis* Schmalzfuss & Ferrara, 1983: 125.

REMARKS

*Feadillo saotomensis* is only known from its type locality Agua Izé in São Tomé (Schmalzfuss & Ferrara 1983).

Genus *Gabunillo* Schmalzfuss & Ferrara, 1983

*Gabunillo* Schmalzfuss & Ferrara, 1983: 128.

TYPE SPECIES. — *Gabunillo coecus* Schmalzfuss & Ferrara, 1983.

*Gabunillo thomensis* n. sp.  
(Figs 2E; 7; 8)

[urn:lsid:zoobank.org:act:9A0C45FD-4370-4BDB-B8B2-AFCA390EF93F](https://zoobank.org/act:9A0C45FD-4370-4BDB-B8B2-AFCA390EF93F)

TYPE MATERIAL. — **Holotype**. Democratic Republic of São Tomé and Príncipe • 1 ♀; Trilho dos Tuneis; 0°18'03.7"N, 6°33'07.4"E; 11.V.2022; L.P. da Silva leg.; MNCN 20.04/20604.

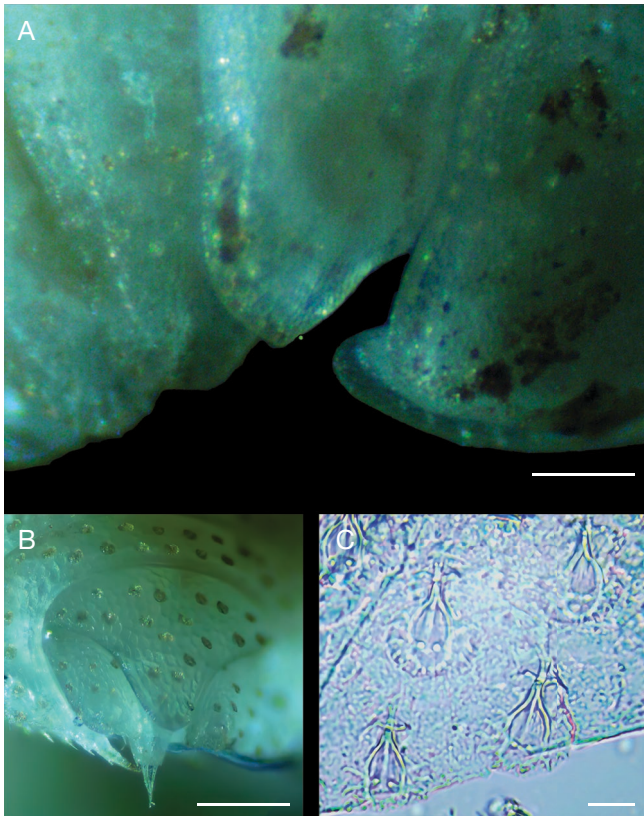


Fig. 7. — *Gabunillo thomensis* n. sp.: **A**, pereonites I and II, lateral view; **B**, telson and uropods; **C**, scale-setae. Scale bars: A, B, 0.1 mm; C, 0.01 mm.

**ETYMOLOGY.** — The specific name refers to the fact that it lives on the island of São Tomé.

**ECOLOGY.** — *Gabunillo thomensis* n. sp. is an epigean species. It was found between litter in a secondary forest.

**DESCRIPTION**

*Body*

Body size 1.5 × 0.8 mm. White colour when captured, likely lacking pigmentation.

*Integumentary characters (Figs 2E; 7A, B; 8A, B)*

Integument without granulations, with a dense covering of large rounded scale-setae with notched margins (Figs 7C; 8E).

*Somatic characters (Figs 2E; 7A, B; 8A-D)*

Strongly convex body, pleuroepimers and neopleurons almost vertical to the ventral side. No ocular apparatus.

**Cephalon.** Vertex separated from the profrons by a thin line that fades in the central part; profrons with a triangular convexity in the center.

**Pereon.** Almost straight posterior edge of tergites I to IV, tergites V to VII with a very small rounded tip. Thickened lateral edge of pleuroepimer I, with a wide and deep schism separating the two lobes; widely rounded anterior lobe; triangular posterior lobe with a rounded apex, protruding

laterally in relation to the anterior. Epimers of pereonites II and III with a triangular lateral edge; conical anterior edge of pereonite II epimer that points towards the posterior edge without reaching it. Pleuroepimers IV to VII quadrangular.

**Pleon.** Highly curved epimers of pleonite V, surrounding the uropod protopods.

**Telson.** Almost as long as wide, with a broad, triangular tip and a rounded apex, with concave lateral edges.

*Appendages (Fig. 8F-Q)*

Mouth apparatus with right mandible with a molar penicil and one + one free penicils and the left mandible with one + one free penicils; maxillule with the outer branch with four + four simple teeth and the inner branch with two penicils; maxilliped endite with a large seta; biarticulated palp with two large setae on the basal segment. Antennula with three segments, second segment much smaller than the other two, third segment with a group of long aesthetascs at the tip. Antenna short and stout; first flagellum segment with a third of the length of the second; second flagellum with a group of short aesthetascs. Uropods with the endopod longer than the telson; protopod grooved on the posterior margin, with a small exopod inserted. Pleopods without respiratory structures in the exopods.

**REMARKS**

The genus *Gabunillo* was established by Schmalzfuss & Ferrara (1983) and currently includes two species, *Gabunillo coecus* Schmalzfuss & Ferrara, 1983 described from Gabon and *Gabunillo aridicola* Souza, Senna & Kury, 2010 described from Brazil.

Schmalzfuss & Ferrara (1983) in their generic description indicate the “pereon segment 1 with a tiny groove along its margin” and in their description of *G. coecus* point out “inner and outer lobes of schisma equal in length”. They also indicate that it lacks pigment and ocular apparatus, the scale-setae present a large elongated scale, the posterior border of the first pereonite is straight and the exopod of the uropod is inserted into an incision at the end of the protopod.

Souza *et al.* (2010) in the description of *G. aridicola* indicate among other characters that it is pigmented, presents an ocular apparatus formed by 13 ommatidia, the scale-setae are triangular and Y-shaped; the posterior edge of the first pereonite is sinuous and the uropod exopod inserts dorsally into protopod. These characters that do not match those indicated for the generic description of *Gabunillo* nor are similar to those of *G. coecus*. Fernandes *et al.* (2019) consider as doubtful the inclusion of *G. aridicola* in this genus, pointing out some differences between *G. aridicola* and *G. coecus* as for example the protopods of the uropods (Fernandes *et al.* 2019: 1119-1120) and the possible presence of monospiracular lungs in pleopods. Considering all these, we also believe it would be appropriate to review the systematic status of *G. aridicola* to confirm if it belongs to the genus *Gabunillo*.

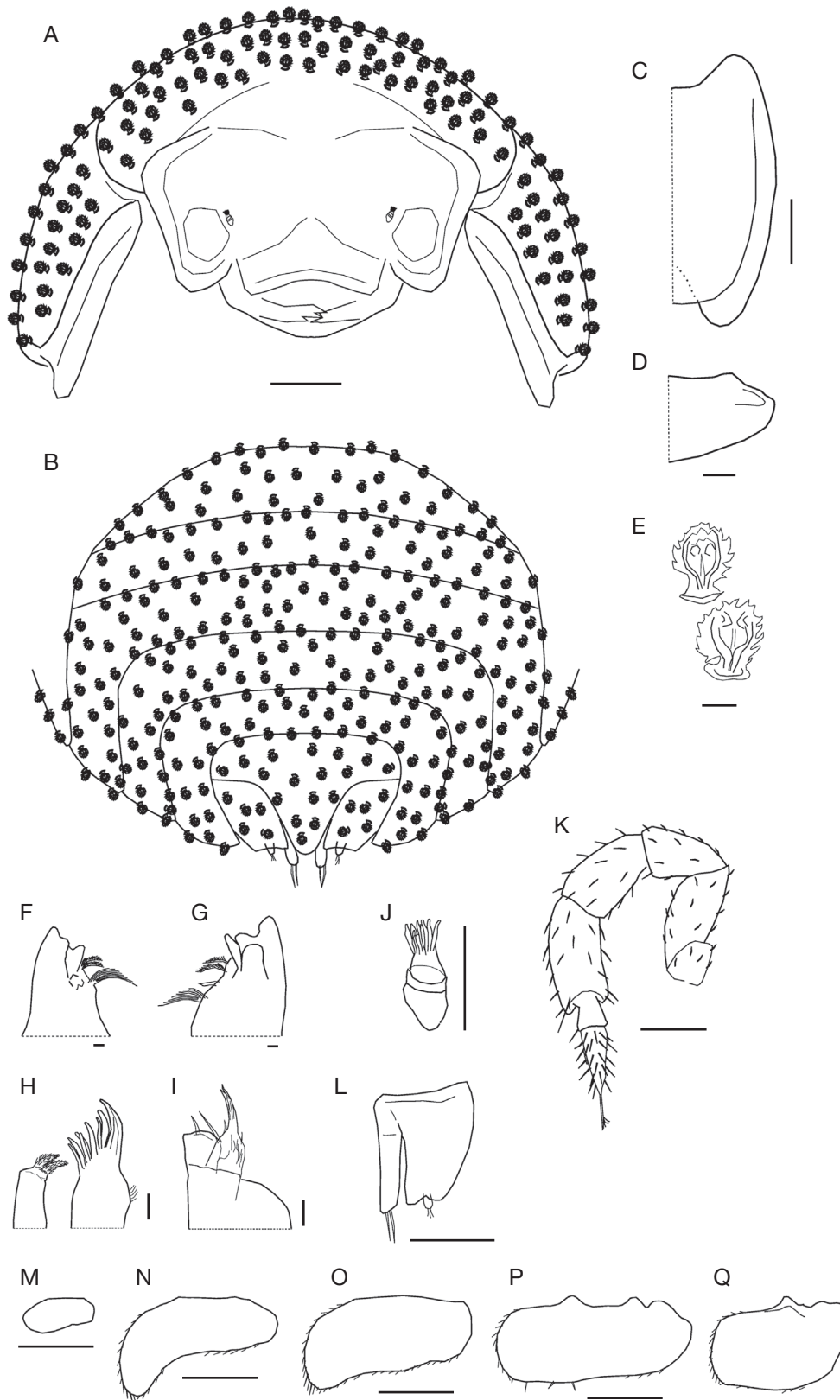


FIG. 8. — *Gabunillo thomensis* n. sp.: **A**, cephalon and pereonite I, frontal view; **B**, pleon, telson and uropods; **C**, pleuroepimer I, dorsal view; **D**, pleuroepimer II, ventral view; **E**, scale-setae; **F**, left mandible; **G**, right mandible; **H**, maxillule; **I**, maxilliped; **J**, antenna; **K**, antenna; **L**, uropod, ventral view; **M**, female exopod I; **N**, female exopod II; **O**, female exopod III; **P**, female exopod IV; **Q**, female exopod V. Scale bars: 0.1 mm.

Arcangeli (1950) in his publication on the isopods captured during the exploration carried out by H. Damas in the Albert National Park (Democratic Republic of the Congo), renamed in 1969 as Virunga, described the species *Eubelum squamatum* Arcangeli, 1950, from specimens captured in Mogenbe. Among other characters, Arcangeli (1950: 25) wrote: “Questa specie si distingue facilmente per la forte pruinosità della superficie dorsale del corpo dovuta a squamosetole a ventaglio (del tipo *Trichorhina*): nello spazio interposto a tali squamosetole il tegumento presenta squame semicircolari (see fig. 74)”. The Italian author gives great importance to the characteristic scale-setae from a *E. squamatum*, that allows its easy separation from the rest of the species of the genus *Eubelum* Budde-Lund, 1885, that currently has 30 species found mainly in equatorial Africa. Arcangeli (1950) also indicates “Il cephalon presenta un margine frontale un poco ribattuto all’indietro nella parte mediana dove è molto sottile”, and “L’inspessimento al margine laterale degli epimeri del 1° pereonite non è molto pronunziato: tuttavia esso presenta un distinto, per quanto tenue, solco longitudinale che posteriormente si risolve nello schisma che sépara due lobi dei quali l’inferiore o coxopodale, più strettamente arrotondato, sorpassa distintamente all’indietro quello superiore”. This is, the junction of the vertex and the profrons is very poorly marked in the middle and the groove on the lateral edge of the first pereonite is also poorly marked. Characters that match the description of the genus *Gabunillo* and not the genus *Eubelum*. It should be noted that Arcangeli (1950) also points to *E. squamatum* that “Il sistema tracheale, discretamente sviluppato negli exopoditi del 1° e 2° paio di pleopodi va riducendosi assai nei successivi”. If indeed this species presents a respiratory system in the exopods of the pleopods, it could not be included in the genus *Gabunillo*. Considering that *E. squamatum* presents some characteristics similar to the species of the genus *Gabunillo*, it seems necessary to establish the differences between genera, to include or not the species in this genus, after verifying the presence or absence of the respiratory system. Arcangeli (1950) indicates that *E. squamatum* ocular apparatus is made up of 15 ommatidia, the fifth segment of the antenna have a sharp tooth, the epimer of the fifth pleonite is slightly divergent and the telson terminates in a subrectangular shape with the end point nearly straight. While also confirming the systematic status of *G. aridicola*, the other two species of the genus *Gabunillo*, *G. coecus* and *G. thomensis* n. sp., differed from *E. squamatum* by the lack of pigmentation, ocular apparatus, the tooth on the fifth segment of the antenna, the lungs in pleopods, the epimer of the fifth pleonite is convergent and the telson ends in a triangular point with a rounded apex.

The new species described in this work, *G. thomensis* n. sp., presents as *G. coecus*, according to Schmalzfuss & Ferrara (1983) description, small size, without pigmentation nor ocular apparatus, cephalon with frontal margin interrupted in the middle, pereon segments II and III with a transversal crest on the ventral side, triangular telson, exopods pleopods without respiratory structures, uropod with a rectangular protopod and a small subterminal exopod. However, it differs from *G. coecus* that has an elongated scale-setae, a small

groove along the edge of the first pereon segment, and the inner and outer lobes of the schisma have equal length. *Gabunillo thomensis* n. sp. has a very wide scale-setae, a wide groove along the edge of the first pereon segment, and inner lobe of the schisma is longer than the outer lobe, allowing these characters to easily separated both species.

Gregory (2014) named as *Gabunillo* Schmalzfuss & Ferrara, 1983, 53 female specimens found in the Rainforest Biome of the Eden Project, an extensive glasshouse complex in Cornwall, United Kingdom. A brief description and some drawings were provided, but no formal description or name were given. The overall appearance of this species is similar to the one described in this work, but the scarce information provided does not allow us to ensure that they are the same species. Moreover, Gregory (2014) indicates that it presents an ocular apparatus formed by a reddish ommatidium and “The entire body surface, including the short stout antennae, is covered in blunt-tipped scale-spines”, while *G. thomensis* n. sp. lacks an ommatidium and its scale-setae have a very large fan-shaped scale with a crenated edge.

#### Genus *Laureola* Barnard, 1960

*Laureola* Barnard, 1960: 53.

TYPE SPECIES. — *Akermania paucispinosa* Barnard, 1949.

#### *Laureola dubia* Schmalzfuss & Ferrara, 1983

*Laureola dubia* Schmalzfuss & Ferrara, 1983: 130.

#### REMARKS

*Laureola dubia* is only known from São Tomé Island and from Roca Infante Don Henrique on Príncipe Island (Schmalzfuss & Ferrara 1983).

#### Genus *Venezillo* Verhoeff, 1928

*Venezillo* Verhoeff, 1928: 114.

TYPE SPECIES. — *Armadillo clausus* Budde-Lund, 1885.

#### *Venezillo crassus* (Budde-Lund, 1904) (Fig. 2F)

*Armadillo crassus* Budde-Lund, 1904: 105.

*Venezillo crassus* – Ferrara & Taiti 1979: 187.

MATERIAL EXAMINED. — **Democratic Republic of São Tomé and Príncipe** • 1 ♂; Água Coimbra; 0°20'35.7"N, 6°37'22.0"E; 19.V.2022; L.P. da Silva leg.; OST062; IBI • 1 ♂; Água Izé; 0°13'27.8"N, 6°43'37.4"E; 18.V.2022; L.P. da Silva leg.; Coll. JC697 • 1 ♂; Água Izé; 0°13'27.8"N, 6°43'37.4"E; 18.V.2022; L.P. da Silva leg.; OST054b; MNHN-IU-2022-1627 • 1 ♀; Água Izé; 0°13'27.8"N, 6°43'37.4"E; 18.V.2022; L.P. da Silva leg.; OST054c; IBI • 1 ♀; Bernardo Faro; 0°13'50.4"N, 6°40'01.8"E; 13.V.2022; L.P. da

Silva leg.; OST030; IBI • 1 ♂; CIAT; 0°20'10.3"N, 6°38'59.4"E; 9.V.2022; L.P. da Silva leg.; MNCN 20.04/14251 • 1 ♀; CIAT; 0°20'10.3"N, 6°38'59.4"E; 9.V.2022; L.P. da Silva leg.; OST015b; MNHN-IU-2022-1628 • 1 ♀; Jardim Botânico do Bom Sucesso; 0°17'26.4"N, 6°36'19.1"E; 14.V.2022; L.P. da Silva leg.; OST031; IBI • 1 ♀; Trilho dos Tuneis; 0°18'28.4"N, 6°33'13.9"E; 11.V.2022; L.P. da Silva leg.; OST024; IBI.

## REMARKS

In São Tomé it was previously cited in Batepá, Portinho and Ribeira Peixe by Ozorio (1892) as *Armadillo officinalis* Desmaret. It is also cited from Agua Ize, Aguazo (Morro Carregado), Colline Mukinki, Monte Café, Ribeira Palma, Samerica, São Tomé and Savanne Baobab (Schmalfuss & Ferrara 1983). The species is only known from the islands of São Tomé and Príncipe.

Family EUBELIDAE Budde-Lund, 1899

Genus *Elumoides* Taiti & Ferrara, 1983

*Elumoides* Taiti & Ferrara, 1983: 215.

TYPE SPECIES. — *Elumoides monocellatus* Taiti & Ferrara, 1983.

*Elumoides atlanticus*\* Ferrara & Schmalfuss, 1983  
(Fig. 2G)

*Elumoides atlanticus* Ferrara & Schmalfuss, 1983: 19.

MATERIAL EXAMINED. — Democratic Republic of São Tomé and Príncipe • 1 ♀; Praia dos Governadores; 0°24'44.0"N, 6°39'41.8"E; 17.V.2022; L.P. da Silva leg.; OST046; IBI • 1 ♂; São Tomé; 0°20'30.0"N, 6°44'12.5"E; 9.V.2022; L.P. da Silva leg.; Coll. JC689 • 5 ♀; São Tomé; 0°20'30.0"N, 6°44'12.5"E; 9.V.2022; L.P. da Silva leg.; OST011b; MNHN-IU-2022-1623 • 1 ♂; São Tomé; 0°20'30.0"N, 6°44'12.5"E; 17.V.2022; L.P. da Silva leg.; MNCN 20.04/14252.

## REMARKS

This small species was only known from Kribi in Cameroon (Schmalfuss & Ferrara 1982; Ferrara & Schmalfuss 1983), and Mbini in Equatorial Guinea (Cifuentes 2021). It is recorded for the first time for São Tomé.

Genus *Eubelum* Budde-Lund, 1885

*Eubelum* Budde-Lund, 1885: 291.

TYPE SPECIES. — *Eubelum lubricum* Budde-Lund, 1885.

*Eubelum asperius* Van Name, 1920  
(Fig. 2H)

*Eubelum asperius* Van Name, 1920: 86.

MATERIAL EXAMINED. — Democratic Republic of São Tomé and Príncipe • 1 ♂; Agripalma; 0°07'38.0"N, 6°35'25.9"E; 18.V.2022; L.P. da Silva leg.; OST059; IBI • 1 ♀; Água Izé; 0°13'27.8"N,

6°43'37.8"E; 18.V.2022; L.P. da Silva leg.; OST053; IBI • 1 ♀; Água Izé; 0°13'27.9"N, 6°43'37.3"E; 18.V.2022; L.P. da Silva leg.; OST055; IBI • 1 ♂; CIAT; 0°20'13.0"N, 6°39'02.6"E; 10.V.2022; L.P. da Silva leg.; MNCN 20.04/14253 • 3 ♀; CIAT; 0°20'13.0"N, 6°39'02.6"E; L.P. da Silva leg.; OST017b; IBI • 3 ♀; CIAT; 0°20'11.6"N, 6°39'00.7"E; 10.V.2022; L.P. da Silva leg.; OST018; IBI • 1 ♂; CIAT; 0°20'11.7"N, 6°39'00.6"E; 10.V.2022; L.P. da Silva leg.; Coll. JC690 • 1 ♂; CIAT; 0°20'11.7"N, 6°39'00.6"E; 10.V.2022; L.P. da Silva leg.; OST016a; MNHN-IU-2022-1624 • 1 ♀; CIAT; 0°20'11.7"N, 6°39'00.6"E; 10.V.2022; L.P. da Silva leg.; OST016b; MNHN-IU-2022-1625 • 1 ♀; Dona Augusta; 0°06'45.8"N, 6°37'41.4"E; 18.V.2022; L.P. da Silva leg.; OST058; IBI • 1 ♂; Sebastião dos Anjos do Rosário – “Sum Mé Xinhô” secondary school; 0°22'23.0"N, 6°38'59.7"E; 19.V.2022; L.P. da Silva leg.; OST064a; IBI • 1 ♀; Sebastião dos Anjos do Rosário – “Sum Mé Xinhô” secondary school; 0°22'23.0"N, 6°38'59.7"E; 19.V.2022; L.P. da Silva leg.; OST064b; IBI • 1 ♀; Malanza; 0°02'38.9"N, 6°31'58.2"E; 18.V.2022; L.P. da Silva leg.; OST061; IBI • 1 ♀; Monte Café; 0°18'02.4"N, 6°38'24.6"E; 15.V.2022; L.P. da Silva leg.; OST038; IBI • 1 ♀; Roça Agostinho Neto; 0°21'37.8"N, 6°38'15.7"E; 19.V.2022; L.P. da Silva leg.; OST063; IBI • 2 ♀; Roça Costa Santos; 0°19'53.9"N, 6°33'26.0"E; 12.V.2022; L.P. da Silva leg.; OST028; IBI • 1 ♀; Roça de São João de Angolares; 0°08'21.3"N, 6°38'51.0"E; 18.V.2022; L.P. da Silva leg.; OST060; IBI • 1 ♀; Secador da Colonia Açoriana; 0°10'42.3"N, 6°40'53.5"E; 18.V.2022; L.P. da Silva leg.; OST057; IBI • 1 ♂; Trilho dos Tuneis; 0°18'28.1"N, 6°33'13.9"E; 11.V.2022; L.P. da Silva leg.; OST025; IBI • 1 ♀; Vale Formoso; 0°13'58.9"N, 6°38'18.2"E; 13.V.2022; L.P. da Silva leg.; OST029; IBI.

## REMARKS

*Eubelum asperius* is known from São Tomé Island from Agua Izé, São Tomé and Vista Alegre (Ferrara & Schmalfuss 1976) and from Aguazo (Morro Carregado), Bombain, Colline Mukinki, Fortunato and São Nicolau, (Ferrara & Schmalfuss 1985). Besides São Tomé, it is also cited from Cameroon, Congo-Brazaville, Gabon, Equatorial Guinea, Democratic Republic of the Congo and Prince Island (Ferrara & Schmalfuss 1976, 1985; Ferrara & Taiti 1979; Cifuentes 2021).

Family PHILOSCIIDAE Kinahan, 1857

Genus *Burmoniscus* Collinge, 1914

*Burmoniscus* Collinge, 1916: 466.

TYPE SPECIES. — *Burmoniscus moulmeinicus* Collinge, 1914.

*Burmoniscus kohleri* (Schmalfuss & Ferrara, 1978)  
(Fig. 2I)

*Rennelloscia kohleri* Schmalfuss & Ferrara, 1978: 56.

*Burmoniscus kohleri* – Taiti & Ferrara 1986: 187.

MATERIAL EXAMINED. — Democratic Republic of São Tomé and Príncipe • 1 ♀; Água Izé; 0°13'27.9"N, 6°43'37.7"E; 18.V.2022; L.P. da Silva leg.; OST051; IBI • 1 ♂; Jardim Botânico do Bom Sucesso; 0°17'20.0"N, 6°36'46.9"E; 14.V.2022; L.P. da Silva leg.; Coll. JC693 • 1 ♀; São Tomé; 0°21'26.8"N, 6°43'12.8"E; 11.V.2022; L.P. da Silva leg.; MNCN 20.04/14254.

REMARKS

It has been cited from Cameroon, Guatemala and São Miguel in São Tomé (Schmalfuss & Ferrara 1978; Ferrara & Schmalfuss 1983, 1985; Taiti & Ferrara 1986; Leistikow 2000).

Genus *Congophiloscia* Arcangeli, 1950

*Congophiloscia* Arcangeli, 1950: 72.

TYPE SPECIES. — *Congophiloscia albofasciata* Arcangeli, 1950.

*Congophiloscia saothomensis* Schmalfuss & Ferrara, 1978 (Fig. 2J)

*Congophiloscia saothomensis* Schmalfuss & Ferrara, 1978: 52.

MATERIAL EXAMINED. — **Democratic Republic of São Tomé and Príncipe** • 1 ♂; Água Izé; 0°13'27.7"N, 6°43'37.7"E; 18.V.2022; L.P. da Silva leg.; Coll. JC696 • 1 ♀; Água Izé. 0°13'27.7"N, 6°43'37.7"E; 18.V.2022; L.P. da Silva leg.; OST049b; MNHN-IU-2022-1619 • 1 ♀; Água Izé. 0°13'27.9"N, 6°43'37.9"E; 18.V.2022; L.P. da Silva leg.; OST050; IBI • 1 ♀; path to Lagoa Azul; 0°23'58.4"N, 6°37'10.6"E; 15.V.2022; L.P. da Silva leg.; OST035; IBI • 1 ♀; São Tomé; 0°21'06.3"N, 6°42'58.6"E; 9.V.2022; L.P. da Silva leg.; OST013; IBI • 1 ♂; São Tomé; 0°21'27.6"N, 6°43'12.7"E; 19.V.2022; L.P. Da Silva leg.; MNCN 20.04/14255.

REMARKS

Schmalfuss & Ferrara (1978) indicate that *Congophiloscia saothomensis* lacks coloration, perhaps due to its conservation in ethanol. We were able to observe live specimens and they present a yellowish-white coloration, except for the ocular apparatus, which are black. It is only known from São Tomé, being cited from Zampalma and São Nicolau (Schmalfuss & Ferrara 1978; Ferrara & Schmalfuss 1985).

Family PLATYARTHRIIDAE Verhoeff, 1949

Genus *Niambia* Budde-Lund, 1904

*Niambia* Budde-Lund, 1904: 37.

TYPE SPECIES. — *Leptotrichus squamatus* Budde-Lund, 1885 (designated by Schmalfuss & Ferrara 1978).

*Niambia atracheata* (Schmalfuss & Ferrara, 1978) (Fig. 2K)

*Leptotrichus atracheatus* Schmalfuss & Ferrara, 1978: 85.

*Niambia atracheata* – Schmalfuss, 1982: 132.

MATERIAL EXAMINED. — **Democratic Republic of São Tomé and Príncipe** • 1 ♂; São Tomé; 0°20'29.3"N, 6°44'13.1"E; 17.V.2022, L.P. da Silva leg.; MNCN 20.04/14256 • 1 ♀; São Tomé; 0°20'29.3"N, 6°44'13.1"E; 17.V.2022, L.P. da Silva leg.; OST043b; IBI • 1 ♂; São Tomé; 0°20'29.2"N, 6°44'12.9"E; 17.V.2022, L.P. da Silva leg.; Coll. JC694 • 1 ♀; São Tomé; 0°20'29.2"N, 6°44'12.9"E; 17.V.2022; L.P. da Silva leg.; OST042b; IBI.

REMARKS

Schmalfuss & Ferrara (1978) described this species as *Leptotrichus atracheatus* Schmalfuss & Ferrara, 1978, but later Schmalfuss (1982) placed it in the genus *Niambia*. In its description, Schmalfuss & Ferrara (1978) placed a question mark in the locality from Zampalma (São Tomé) given that: “the tube also contains a label: «Luanda, Angola, Aug. 1949, L. F. Galbraith””. The collected specimens mentioned in the previous section allowed us to attest that this species is indeed found on this island.

Genus *Trichorbina* Budde-Lund, 1908

*Trichorbina* Budde-Lund, 1908: 293.

TYPE SPECIES. — *Bathytrapa thermophila* Dollfus, 1896.

*Trichorbina hospes* Silvestri, 1918 (Fig. 2L)

*Trichorbina hospes* Silvestri, 1918: 292.

MATERIAL EXAMINED. — **Democratic Republic of São Tomé and Príncipe** • 1 ♀; Água Izé; 0°13'28.2"N, 6°43'37.5"E; 18.V.2022; L.P. da Silva leg.; MNCN 20.04/14257 • 3 ♀; Secador da Colonia Açoriana; 0°10'42.6"N, 6°40'54.0"E; 18.V.2022; L.P. da Silva leg.; OST056; IBI.

REMARKS

This species has very characteristic antennula and scale-setae (Fig. 2M, N). Ferrara & Schmalfuss (1985) have cited it from São Tomé in San Miguel and Esprainza. It is also known from Nigeria, where it was described by Silvestri (1918).

*Trichorbina kribensis*\* Ferrara & Schmalfuss, 1983 (Fig. 2O)

*Trichorbina kribensis* Ferrara & Schmalfuss, 1983: 17.

MATERIAL EXAMINED. — **Democratic Republic of São Tomé and Príncipe** • 2 ♀; CIAT; 0°20'14.4"N, 6°39'03.8"E; 9.V.2022; L.P. da Silva leg.; OST014; IBI • 2 ♀; CIAT; 0°20'12.4"N, 6°39'01.8"E; 10.V.2022; L.P. da Silva leg.; OST020; IBI • 4 ♀; Jardim Botânico do Bom Sucesso; 0°17'19.9"N, 6°36'44.3"E; 14.V.2022; L.P. da Silva leg.; OST033; IBI • 1 ♀; Jardim Botânico do Bom Sucesso; 0°17'19.9"N, 6°36'44.3"E; 14.V.2022; L.P. da Silva leg.; Coll. JC692 • 5 ♀, 4 immatures; Lagoa Azul; 0°24'22.6"N, 6°36'35.2"E; 15.V.2022; L.P. da Silva leg.; OST036; IBI • 1 ♀; Lagoa Azul; 0°24'21.6"N, 6°36'39.0"E; 15.V.2022; L.P. da Silva leg.; OST037; MNHN-IU-2022-1626 • 7 ♀; São Tomé; 0°21'26.7"N, 6°43'12.3"E; 9.V.2022; L.P. da Silva leg.; OST006; IBI • 7 ♀; São Tomé; 0°21'25.8"N, 6°43'12.4"E; 9.V.2022; L.P. da Silva leg.; OST007; IBI • 1 ♀; São Tomé; 0°20'30.1"N, 6°44'12.6"E; 9.V.2022; L.P. da Silva leg.; MNCN 20.04/14258 • 1 ♂; São Tomé; 0°20'29.2"N, 6°44'12.9"E; 17.V.2022; L.P. da Silva leg. OST041; IBI • 1 ♀; São Tomé; 0°20'29.1"N, 6°44'12.8"E; 17.V.2022; L.P. da Silva leg.; OST039; IBI.

REMARKS

Both the antennula and the scale-setae (Fig. 2P, Q) serve to differentiate *Trichorbina kribensis* from the previous species.



This species was known from Cameroon (Schmalfuss & Ferrara 1982; Ferrara & Schmalfuss 1983) and Equatorial Guinea (Cifuentes 2021). It is recorded for the first time for São Tomé.

Family PORCELLIONIDAE Brandt & Ratzeburg, 1833

Genus *Porcellionides* Miers, 1877

*Porcellionides* Miers, 1877: 668.

TYPE SPECIES. — *Porcellio* (*Porcellionides*) *jelskii* Miers, 1877 (designated by Schmalfuss & Ferrara 1978).

*Porcellionides pruinosus* (Brandt, 1833)

*Porcellio pruinosus* Brandt, 1833: 181.

*Porcellionides pruinosus* – Schmalfuss & Ferrara 1978: 87.

#### REMARKS

In São Tomé, it has been cited from Fortunato (Ferrara & Schmalfuss 1985). This species of Mediterranean origin has been introduced to other regions of the world (Schmalfuss 2003).

Family TRACHELIPODIDAE Strouhal, 1953

Genus *Nagurus* Holthuis, 1949

*Nagurus* Holthuis, 1949: 182.

TYPE SPECIES. — *Porcellio cristatus* Dollfus, 1889.

*Nagurus cristatus*\* (Dollfus, 1889)  
(Fig. 2R)

*Porcellio cristatus* Dollfus, 1889: 91.

*Nagurus cristatus* – Holthuis 1949: 182.

MATERIAL EXAMINED. — **Democratic Republic of São Tomé and Príncipe** • 2 ♀; Jardim Botânico do Bom Sucesso; 0°17'19.8"N, 6°36'44.0"E; 14.V.2022; L.P. da Silva leg.; OST032; IBI.

#### REMARKS

Schmalfuss (2003) indicates that *Nagurus cristatus* is a pantropical species, that can be found in greenhouses in temperate climates. In Europe it has been cited from greenhouses in Germany, Belgium, France, the Netherlands, the United Kingdom, Romania and Switzerland (Holthuis 1945, 1949, 1956; Berg 1997; Soesbergen 2003; Berg *et al.* 2008; Cochard *et al.* 2010; Gregory 2009, 2014; Giurginca *et al.* 2015; Séchet & Noël 2015; De Smedt *et al.* 2017, 2018; Cifuentes *et al.* 2022). It is recorded for the first time for São Tomé.

## DISCUSSION

The species inventory of the terrestrial isopods from São Tomé Island, according to our data and the data from Ozorio (1892), Ferrara & Schmalfuss (1976, 1983, 1985), Schmalfuss & Ferrara (1978, 1983) and Schmalfuss (1982) comprises 17 species that belong to six families. The most diverse family is Armadillidae with seven species (*Ctenorillo atlanticus* n. sp.; *C. bananae*; *Cubaris murina*; *Feadillo saotomensis*; *Gabunillo thomensis* n. sp.; *Laureola dubia* and *Venezillo crassus*); followed by the family Platyarthridae with three species (*Niambia atracheata*; *Trichorhina hospes* and *T. kribensis*); followed by Eubelidae (*Elumoides atlanticus* and *Eubelum asperius*) and Philosciidae (*Burmoniscus kohleri* and *Congophiloscia saothomensis*) with two species each; and Agnaridae (*Agnara madagascariensis*), Porcellionidae (*Porcellionides pruinosus*) and Trachelipodidae (*Nagurus cristatus*) with only one species each.

The previous work from Cifuentes (2021) made comparisons between the known terrestrial isopod faunas of the islands of the Gulf of Guinea and the mainland. This new study shows that the species richness of these islands is greater than the initial data suggested, still, although our sampling raised the number of known species by six, this is a modest number considering that 21 localities were sampled. Nonetheless, it is likely that more species occur in the island, since the less accessible regions and areas with primary forest were not sampled. Currently there are 18 species of terrestrial isopods known from Bioko (Cifuentes 2021), of which only three are known exclusively from this island, *Rhodesillo insulanus* Schmalfuss & Ferrara, 1983 from the family Armadillidae; *Mesarmadillo montanum* (Verhoeff, 1942) from the family Eubelidae; and *Pleopodoscia isabelensis* Verhoeff, 1942 from the family Philosciidae. The greater proximity of Bioko to the continent (37 km) and its previous connection to the mainland, are likely the reasons why it shares many species with nearby Cameroon. For the Príncipe Island, there are six known species, from which three are endemic, *Feadillo principensis* Schmalfuss & Ferrara, 1983 and *Pseudolobodillo principensis* Schmalfuss & Ferrara, 1983 from the family Armadillidae, and *Metaperiscyphops insulanus* Ferrara & Schmalfuss, 1976 from the family Eubelidae. Príncipe is at approximately 210 km from Bioko and the mainland and at almost 150 km from São Tomé. From São Tomé there are currently 17 known species, four that are endemic, *Ctenorillo atlanticus* n. sp., *Feadillo saotomensis* and *Gabunillo thomensis* n. sp. from the family Armadillidae, and *Congophiloscia saothomensis* from the family Philosciidae. As previously mentioned, Schmalfuss & Ferrara (1978) indicated with a question mark the presence of *Niambia atracheata* from the family Platyarthridae in São Tomé, and although it has been cited for this island in this work, there is no certainty that it is not also found in Angola, according to these authors. Finally, from the Annabón Island, at 185 km from São Tomé and 350 km from the mainland, only six species are known, of which five are endemic, *Anchicubaris annobonensis* Schmalfuss & Ferrara, 1983; *Annobodillo coecus* Schmalfuss & Ferrara, 1983; *Cubaris maculata* Schmalfuss & Ferrara, 1983; and *Paraxen-*

*odillo singularis* Schmalzfuss & Ferrara, 1983 from the family Armadillidae, and *Congophiloscia annobonensis* Schmalzfuss & Ferrara, 1978 from the family Philosciidae. Thus, Cameroon, a country from which 57 species have been cited (see Cifuentes 2021), shares 15 species with the island of Bioko, but only six with São Tomé, and only one species (*P. pruinosus*), with the island of Annobón. According to our current knowledge, Bioko only shares a single species, *T. kribensis*, with São Tomé, an island separated from it by about 370 km, and does not share any species with the more distant island Annobón, almost 600 km away. On the other hand, despite the scarce inventory of species on Príncipe Island, only six species are known to date, of which three are also found on São Tomé Island. Finally, although the fauna of terrestrial isopods from other West African countries, such as Angola, Congo, Gabon or the Democratic Republic of Congo, is very little known (see Schmalzfuss 2003), only two of the species found on the island of São Tomé are also known from these countries, *C. bananae* and *E. asperius*, which have also been reported from Cameroon (Schmalzfuss 2003).

The islands of the Gulf of Guinea were always isolated among them and between the continental mainland since their formation several million years ago, with the exception of the Bioko Island that was connected and disconnected several times from the continent (Lambeck & Chappell 2001; Ceriaco *et al.* 2022). As expected, and as in the work by Cifuentes (2021), there is an overall reduction in the number of species with the increase of the distance to the mainland, with an increase in the degree of endemism, from Bioko (18 species; 17% endemic), Príncipe (6; 50%); São Tomé (17; 23%) and Annobón (6; 83%). São Tomé seems to not fit well in this pattern, with more species and less endemism, but this is likely a result from the current work that almost doubled the previous number of species known from this island, and there are no recent similar efforts of sampling this taxon on others islands, that we are aware of. Given the isolation of Gulf of Guinea islands, especially the oceanic islands, these terrestrial species have had to be transported to these islands in order to colonize them. This transport had to occur in early phases since their colonization, perhaps through various means and at different times, since different endemic species are found there and since the islands share a very low number of species. For the oceanic islands, current shared species between the continent and even between islands are likely highly influenced by human activity, as well documented for other terrestrial taxa (e.g. Figueiredo *et al.* 2011; Ceriaco *et al.* 2022).

Although we have considered several species as endemic, it must be taken into account that these considerations are provisional and have been obtained based on current knowledge, that will likely change in the future. More work on the isopod fauna of Gulf of Guinea islands is needed, and this is likely to increase the number of species known in all islands. Additional work on this group in nearby continental countries is needed as well, as more species are likely to be shared, especially species introduced by anthropogenic means in the last five centuries.

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