



## Research article

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# Taxonomic revision of the Andean genus *Eulibitia* Roewer, 1912 (Arachnida, Opiliones, Cosmetidae), with the description of five new species

Miguel MEDRANO<sup>1,\*</sup> & Adriano B. KURY<sup>2</sup>

<sup>1,2</sup> Departamento de Invertebrados, Museu Nacional/UFRJ, Quinta da Boa Vista,  
São Cristóvão, 20940-040, Rio de Janeiro – RJ, Brazil.

\* Corresponding author: [miangelmed@gmail.com](mailto:miangelmed@gmail.com)

<sup>2</sup> Email: [adrianok@gmail.com](mailto:adrianok@gmail.com)

<sup>1</sup> [urn:lsid:zoobank.org:author:C7F7D4CF-F9B2-44AF-9F03-86278ADBD4F2](https://zoobank.org/author:C7F7D4CF-F9B2-44AF-9F03-86278ADBD4F2)

<sup>2</sup> [urn:lsid:zoobank.org:author:60FAE1F8-87F7-4A5F-BE78-BEB25BC4F898](https://zoobank.org/author:60FAE1F8-87F7-4A5F-BE78-BEB25BC4F898)

**Abstract.** The genus *Eulibitia* was described by Roewer including three species from Colombia and Ecuador: *Eulibitia maculata* Roewer, 1912, *E. annulipes* Roewer, 1912 and *E. sexpunctata* Roewer, 1914. Herein, the genus is revisited and only the type species, *Eulibitia maculata* Roewer, 1912 is maintained from the previous configuration. *Eulibitia sexpunctata* is transferred to *Ambatoiella* Mello-Leitão, 1943 and *E. annulipes* is considered as *Cosmetinae incertae sedis*. *Acromares lateralis* Goodnight & Goodnight, 1943 and *Paramessa castanea* (Sørensen, 1932) are here considered junior subjective synonyms of *Messatana scalaris* (Sørensen, 1932) and *Eulibitia maculata*, respectively. *Brachylibitia* Mello-Leitão, 1941, currently a junior synonym of *Platymessa*, is regarded as a synonym of *Eulibitia*. *Platymessa* Mello-Leitão, 1941, with two species, and the monotypic genera *Messatana* Strand, 1942 and *Paramessa* Mello-Leitão, 1933, are synonymized with *Eulibitia* Roewer, 1912, yielding the following new combinations: *Eulibitia ectroxantha* (for *Brachylibitia ectroxantha* Mello-Leitão, 1941), *E. h-inscriptum* (for *Platymessa h-inscripta* Mello-Leitão, 1941) and *E. scalaris* (for *Libitia (Messa) scalaris* Sørensen, 1932). *Eulibitia* is re-diagnosed and five new species are described: *E. castor* sp. nov., *E. pollux* sp. nov., *E. clytemnestra* sp. nov., *E. leda* sp. nov. and *E. helena* sp. nov. A key to the nine *Eulibitia* species is presented; the morphology of *Eulibitia* is compared with that of *Libitia*, *Libitiella* and *Ambatoiella*.

**Keywords.** Laniatores, Gonyleptoidea, Colombia, Ecuador, Neotropics.

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## Introduction

Opiliones are the third most diverse order of arachnids, comprising more than 6500 species and superseded only by Acari and Araneae (Harvey 2002). With more than 4200 species, Laniatores Thorell, 1876 is

the most diverse suborder of harvestmen (Kury 2016a), possessing a convoluted and obscure taxonomy (Kury 2003). Gonyleptoidea is by far the largest superfamily of Laniatores, featuring more than 2000 species distributed mainly in the Neotropics. The internal relationships in Gonyleptoidea are rather fluid, with many recent rearrangements (e.g., Kury 2014; Pinto-da-Rocha *et al.* 2014), but the family Cosmetidae is universally recognized as a clade. Cosmetidae is supported among many other features by having the pedipalpus with a flattened femur, spoon-shaped tibia (Kury & Pinto-da-Rocha 2007) and a defensive behavior known as leg dabbing (character 46 in Caetano & Machado 2013, although they only used the species *Gryne coccinelloides* (Mello-Leitão, 1935) and *Vonones sayi* (Simon, 1879)).

The German author C.-F. Roewer (e.g., 1912, 1923) created a system of diagnosing genera based on immediately recognizable tarsal counts and the armature of the ocularium, dorsal scutum and free tergites. This has been widely called the “Roewerian system” (starting with Henriksen 1932: 222). All these characters have been repeatedly demonstrated to be variable individually, sexually dimorphic and of dubious interpretation (e.g., Piza 1942; Soares & Soares 1985; Kury 1990). Roewer ignored most of the potentially useful diagnostic features (e.g., shape of dorsal scutum (DS) outline, spot pattern in DS, armature of basal segments of legs, shape of glans, chaetotaxy of penis ventral plate) in favor of the above cited character sets, resulting in obviously artificial assemblages.

The Roewerian system affected particularly the Cosmetidae because the external morphology in many species is very conservative and there are no suprageneric subdivisions which would turn their 700 species diversity (Kury 2013) into manageable units. The historical subfamilies proposed, Discosomaticinae and Cosmetinae, have been deemed not to be monophyletic groups (see Ferreira & Kury 2010). The present project attempts to clarify a part of the grim history of the Andean Cosmetidae by revising a group of small Opiliones, here grouped and diagnosed as the genus *Eulibitia* Roewer, 1912. Additionally, the genus was compared morphologically with species of apparently related genera, such as *Libitia* Simon, 1879, *Libitiella* Roewer, 1947, *Ambatoiella* Mello-Leitão, 1943 and *Taito* Kury & Barros, 2014.

### **Taxonomic background**

The Andean species of Cosmetidae were only summarily described in the Roewerian literature, dating mainly from the early 20th century. The current generic allocations of the species are in most cases unsatisfactory.

The genus *Eulibitia* was erected by Roewer (1912) for the species *E. maculata* Roewer, 1912 (from Colombia) and *E. annulipes* Roewer, 1912 (from the Pacific coast of Ecuador), which share the following characteristics: (1) body flattened and legs strong and short, (2) no sexual dimorphism in chelicerae or legs, (3) scutal areas I–III unarmed and IV–V with a pair of paramedian tubercles, and (4) tarsal counts: 6/>6/6/6. Later, Roewer (1914) described a third species from Ecuador, *Eulibita sexpunctata* Roewer, 1914.

Sørensen (in Henriksen 1932) created the subgenus *Messa*, inside *Libitia* Simon, 1879, grouping the species *L. argentina* (Sørensen, 1884) and *L. paraguayensis* (Sørensen, 1884), and described two new ones: *L. scalaris* and *L. castanea*, both from Bogotá, Colombia. Nevertheless, the name *Messa* was not valid until Mello-Leitão’s (1933) assignation of type species and description (Kury & Alonso-Zarazaga 2011). Mello-Leitão (1933) transferred the four species of the subgenus to four different genera, as follows: *L. paraguayensis* to *Metalibitia* Roewer, 1912, *L. argentina* to *Paralibitia* Roewer, 1912 (currently synonymized with *Metalibitia*), *L. scalaris* to *Messa* Mello-Leitão, 1933 and *L. castanea* to the newly created *Paramessa* Mello-Leitão, 1933. Ultimately, Strand (1942) replaced the name *Messa* with *Messatana* Strand, 1942 to avoid a conflict with the senior homonym *Messa* Leach, 1817 (Hymenoptera).

Goodnight & Goodnight (1942a) described the genus *Acromares* Goodnight & Goodnight, 1942 for the Mexican species *A. banksi* Goodnight & Goodnight, 1942, characterized by the presence of two spines in the IV scutal area. In two later papers (Goodnight & Goodnight 1942b, 1943), they described two more species: *A. vittatum* Goodnight & Goodnight, 1942 from Belize and *A. lateralis* Goodnight & Goodnight, 1943 from Colombia. However, the Colombian species differs from the others by having two tubercles on the posterior margin of DS instead of scutal area IV, showing no apparent congeneric relation. This is reinforced by the disjointed distribution of this species compared to the other two.

Mello-Leitão (1941) described the monotypic genus *Brachylibitia* Mello-Leitão, 1941 and the genus *Platymessa* Mello-Leitão, 1941 with two species *P. h-inscripta* Mello-Leitão, 1941 and *P. nigrolimbata* Mello-Leitão, 1941; both genera were described from the Andes of Colombia. In a later work, Roewer (1963) described a third species, *P. transversalis* Roewer, 1963 from Cajamarca, Peru. Finally, Medrano & Kury (2016) considered *P. nigrolimbata* as a junior synonym of *P. h-inscriptum*, synonymized *Brachylibitia* with *Platymessa*, transferring *B. ectroxantha* to *Platymessa* and *P. transversalis* to *Chusgonosbius* Roewer, 1952, yielding the new combinations *P. ectroxantha* and *C. transversalis*, rendering *Platymessa* a monotypic genus.

## Material and methods

Although the taxonomy of Cosmetidae is still unstable, an effort has been made here to provide a diagnosis of *Eulibitia* comparing it with genera that are morphologically similar (see Discussion). Therefore, a choice of the genera for comparison was made among cosmetids with the following characteristics: (1) small body, not exceeding 5 mm in length; (2) monomorphic chelicerae; (3) flat body in lateral view, that is, without large tubercles or spines in the scutal areas; and (4) short legs, femur length not exceeding twice the body length.

Abbreviations of depository collections are as follows:

- AMNH = American Museum of Natural History, New York, USA
- BMNH = The Natural History Museum, London, United Kingdom
- IAvH = Instituto Alexander von Humboldt, Villa de Leyva, Colombia
- ICN-AO = Instituto de Ciencias Naturales-Arachnida, Opiliones, Universidad Nacional de Colombia, Bogotá, Colombia
- MNHN = Muséum National d'Histoire Naturelle, Paris, France
- MNRJ = Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil
- SMF = Naturmuseum Senckenberg Sektion Arachnologie, Frankfurt, Germany
- ZMH = Zoologisches Institut und Zoologisches Museum, Hamburg, Germany

The types of Sørensen were photographed in the Sackler Biodiversity Imaging Laboratory of BMNH through their image capture system.

Descriptions follow Medrano & Kury (2016) for external morphology; DaSilva & Gnaspini (2009) for the dorsal armature; Kury & Medrano (2016) for the outline of the dorsal scutum; Kury & Villarreal (2015) and Medrano & Kury (2016) for the chaetotaxy of macrosetae on the ventral plate of the penis; and Kury (2016b) for terminology of the microsetae. The order of numbers of tarsomeres in tarsus I to IV is from left to right side (figures in parentheses denote number of tarsomeres only in the distitarsi I–II). The caruncle (Ferreira & Kury 2010), also called wattle (Kury & Barros 2014), is the distal serrate crest of the stylus of Cosmetidae and closely related families that resembles a cockscomb. All measurements are in millimeters unless otherwise noted. The color patterns were based only on specimens preserved in 70% ethanol, using the standard names of the 267 color centroids of the NBS/IBCC Color System (Jaffer 2001–) as explained in Kury & Orrico (2006).

The following abbreviations are used:

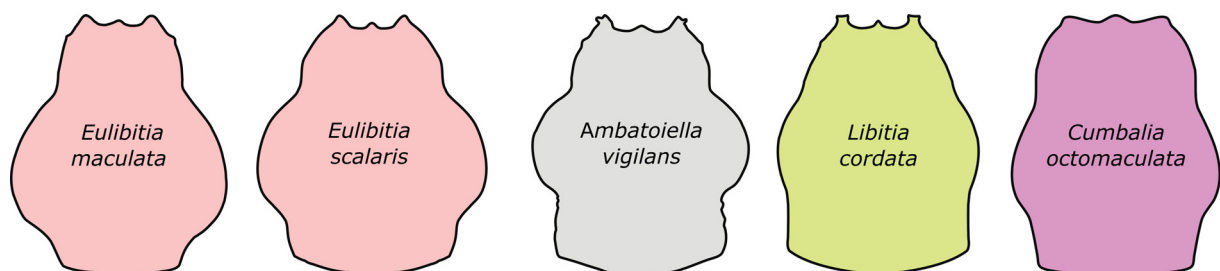
AL = abdominal scutum length  
 AW = abdominal scutum width  
 CL = carapace length  
 CW = carapace width  
 Cx = coxa  
 DS = dorsal scutum  
 Fe = femur  
 MS = macrosetae  
 Mt = metatarsus  
 Pp = pedipalpus  
 Ta = tarsus  
 Ti = tibia  
 Tr = trochanter  
 VP = ventral plate

Information on the material examined enclosed in square brackets [ ] was obtained during this study and is not part of the original label data. The geographical coordinates were obtained directly from the labels (unless in square brackets).

The specimens were submerged in 70% alcohol on blue sand to improve contrast and avoid movement. Dry specimens were necessary to illustrate tubercles of small size. The illustrations were made using a stereo microscope with a camera lucida and digitalized using the software Inkscape v. 0.48. Photographs were taken with a Sony Cybershot DSC-V1 camera attached to the stereo microscope. The software package COMBINEZ, version COMBINEZP (Hadley 2015), was used to create composite images with extended depth of field. The resulting images were edited with Photoshop CS5. The plates were prepared in Inkscape for line drawings and Corel Draw X7 for photographs.

The treatment of the male genitalia follows Acosta *et al.* (2007). Drawings were made in Inkscape based on the series of photographs taken using a stereo microscope equipped with a digital camera and composed with COMBINEZ. Scanning electron microscopy was carried out with a JEOL JSM-6390LV at the Center for Scanning Electron Microscopy of MNRJ, with an accelerating voltage of 10 kV after sputter-coating with gold-palladium.

Geographical coordinates for localities were obtained from Geonames (2015) when they were not present on the labels. The distribution map was produced using ESRI ARCGIS v. 10 software. Localities are referred to the WWF Terrestrial Ecoregions of the World (Olson *et al.* 2001, here abbreviated as WWF).



**Fig. 1.** Schematic outline of DS of *Eulibitia* Roewer, 1912 (beta), *Ambatoiella* Mello-Leitão, 1943 (alpha), *Libitia* Simon, 1879 (alpha) and *Cumbalia* Roewer, 1963 (kappa).



## Results

Class Arachnida Lamarck, 1801  
 Order Opiliones Sundevall, 1833  
 Suborder Laniatores Thorell, 1876  
 Infraorder Grassatores Kury, 2002  
 Superfamily Gonyleptoidea Sundevall, 1833  
 Family Cosmetidae C.L. Koch, 1839  
 Subfamily Cosmetinae C.L. Koch, 1839

### *Eulibitia* Roewer, 1912

- Eulibitia* Roewer, 1912: 16 (type species: *Eulibitia maculata* Roewer, 1912, by original designation).  
*Libitia* (Messa) Sørensen in Henriksen, 1932: 412 (junior homonym of *Messa* Leach, 1817 (Hymenoptera) and unavailable name because no type species was designated). **Syn. nov.**  
*Messa* Mello-Leitão, 1933: 107, 112 (available because a type species was designated and a description provided, but still invalid due to homonymy; type species: *Libitia* (Messa) *scalaris* Sørensen, 1932, by original designation). **Syn. nov.**  
*Paramessa* Mello-Leitão, 1933: 109 (type species: *Libitia* (Messa) *castanea* Sørensen, 1932, by original designation). **Syn. nov.**  
*Brachylibitia* Mello-Leitão, 1941: 166 (junior subjective synonym of *Cynorta* C.L. Koch, 1839 according to Goodnight & Goodnight (1953: 38); synonymy disclaimed by Kury (2003); junior subjective synonym of *Platymessa* Mello-Leitão, 1941 according to Medrano & Kury (2016); type species: *Brachylibitia ectroxantha* Mello-Leitão, 1941, by original designation). **Syn. nov.**  
*Platymessa* Mello-Leitão, 1941: 167 (type species: *Platymessa h-inscripta* Mello-Leitão, 1941, by original designation). **Syn. nov.**  
*Messatana* Strand, 1942: 398 (replacement name for *Messa* Mello-Leitão, 1933). **Syn. nov.**
- Eulibitia* – Roewer 1914: 127; 1923: 298; 1928: 547. — Mello-Leitão 1926: 331; 1932: 56; 1933: 106. — Kury 2003: 60. — Pinto-da-Rocha & Hara 2011: 10. — Medrano & Kury 2016: 52.  
*Messa* – Mello-Leitão 1935: 114. — Kury & Alonso-Zarazaga 2011: 50.  
*Platymessa* (incorrect original spelling) – Mello-Leitão 1941: 167.  
*Platymessa* – Roewer 1963: 52. — Kury 2003: 81. — Medrano & Kury 2016: 54.  
*Brachylibitia* – Kury 2003: 38.  
*Messatana* – Kury 2003: 67. — Kury & Alonso-Zarazaga 2011: 50.  
*Paramessa* – Kury 2003: 80.

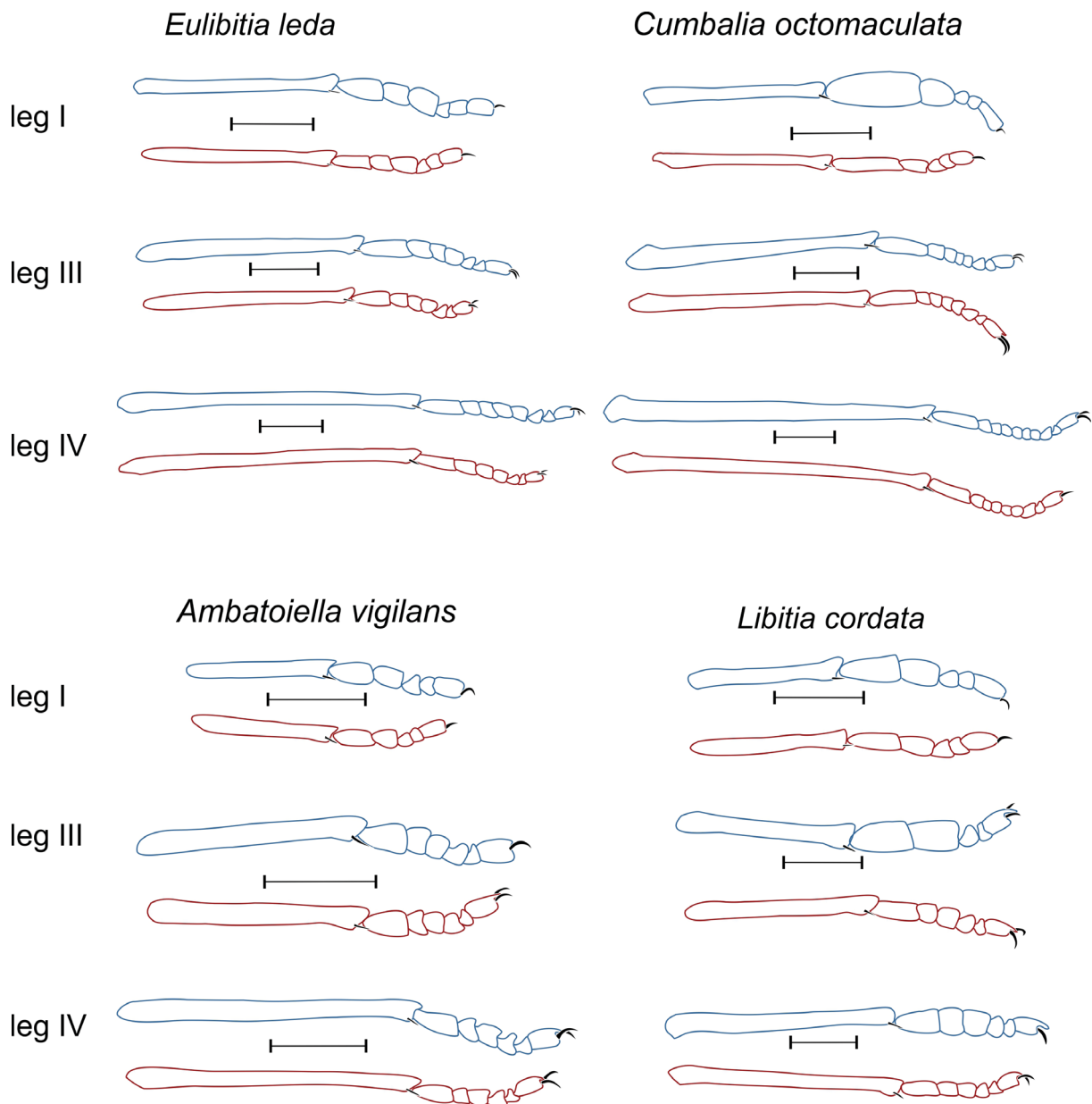
## Diagnosis

Outline of the dorsal scutum beta-shaped, with coda convergent posteriorly in males and almost parallel in females; protoglyphs shallow, with well-marked lateral triangular or rounded projections (Figs 1, 6A). Posterior margin of scutum armed with two small paramedian tubercles (except for *E. maculata*). Areas II and IV unarmed (Figs 5–6). Yellowish white color markings of scutum as a ladder mask over dark brown background, blots dissociated sometimes to the point of having no white marking (Fig. 20A, C–H). Spot as a yellowish band on posterior margin, posterior to paramedian tubercles, sometimes dissociated medially (Figs 12A, 16A). Coxa IV entirely visible in dorsal view, reaching posterior groove of scutal area III (Figs 5A, 8A). Chelicerae (Figs 7F, 13A) monomorphic, weak, with marginal rows of acuminate tubercles of varied size on posterior border. Movable and fixed fingers with blunt teeth (Fig. 17A). Pedipalpal femur with a dorsal keel formed by a row of tubercles (Figs 10E, 17E). Legs short and strong, Fe III and IV slightly arched to the inside (Fig. 21A–C); basitarsomeres of leg I of male thicker than distitarsomeres (Fig. 2). Tarsal counts: 4–6; 6–14; 6–7; 6–9. Ventral plate of penis

subrectangular laterally, with 6 pairs of MS, organized from base to top as follows: A1–A2, D1–D2, C1–C2; and ventrally: B basally and E1–E2 distally (Figs 3, 22; contrasting with *Ambatoiella* and *Libitia*, see Fig. 4A, E). Microsetae of type T4, restricted to lateral margins of ventral side of VP as two parallel stripes from corners to MS B (Fig. 30A, C–D).

### Etymology

*Eulibitia*: from Greek εὖ (rightful, proper, good) + pre-existing generic name *Libitia* (with origin obscure, but sounds like an Ancient Roman woman's name). Gender feminine. *Messa*: from a city name in Ancient Greece. Gender feminine. *Paramessa*: from Greek παρά (beside) + pre-existing genus *Messa*.



**Fig. 2.** Metatarsus and tarsomeres of legs I, III and IV of the cosmetine genera treated here, showing the proportions and thickening of the articles. Each pair of legs contains depiction of male above and female below. Scale bars: 1 mm.

Gender feminine. *Brachylibitia*: from Greek βραχύς (short) + pre-existing generic name *Libitia*. Gender feminine. *Platymessa*: from Greek πλατύ- (flattened) + pre-existing generic name *Messa*. Gender feminine. *Messatana*: variation of pre-existing genus *Messa*. Gender feminine.

### Included species

*Eulibitia maculata* Roewer, 1912 (type species), *E. scalaris* (Sørensen, 1932) comb. nov., *E. h-inscriptum* (Mello-Leitão, 1941) comb. nov., *E. ectroxantha* (Mello-Leitão, 1941) comb. nov., *E. castor* sp. nov., *E. clytemnestra* sp. nov., *E. helena* sp. nov., *E. leda* sp. nov. and *E. pollux* sp. nov.

### Key to the species of *Eulibitia* (males only)

Although no material of the species *E. ectroxantha* has been examined in this project, the description and illustrations provided by Mello-Leitão (1941) are sufficient and appropriated for this key, taking into account the characteristics listed for the other species in this section.

1. Scutal area I without tubercles, coxa IV without clavi inguines (Figs 8A, 9A) .....2
  - Scutal area I with two paramedian tubercles, coxa IV with clavi inguines (Figs 12A, 16A) .....5
2. Scutal area III with two paramedian tubercles .....*E. ectroxantha* (Mello-Leitão, 1941) comb. nov.
  - Scutal area III without two paramedian tubercles (Figs 9A, 20A) .....3
3. Scutum entirely unarmed (Figs 19, 20A) .....*E. maculata* Roewer, 1912
  - Posterior margin of scutum with two paramedian tubercles (Fig. 20A) .....4
4. Posterior margin of scutum with two paramedian tubercles, separated and rounded (Fig. 8A–B); lateral margins of DS smooth (Fig. 9A); penial MS D2 large and straight (Fig. 9B–C) .....
  - .....*E. clytemnestra* sp. nov.
  - Posterior margin of scutum with paramedian tubercles, contiguous and acuminate (Fig. 23A); lateral margins of DS with an irregular row of tubercles (Fig. 24A); penial MS D2 minute (Fig. 26B) .....*E. pollux* sp. nov.
5. Ladder mask reaching lateral margins of DS (see Medrano & Kury 2016: figs 10–18) .....
  - .....*E. h-inscriptum* (Mello-Leitão, 1941) comb. nov.
  - Ladder mask confined to mesotergum (Fig. 28C–H) .....6
6. Posterior margin of scutum with two acuminate paramedian tubercles slanted backward (Fig. 5E) .....
  - .....*E. castor* sp. nov.
  - Posterior margin of scutum with two rounded, erect paramedian tubercles (Figs 11E, 15E) .....7
7. Ladder mask overflowing the scutal grooves to reach areas I, II and III (Figs 11, 12A); femur IV straight, with a large dorso-apical spine (Fig. 12C–D) .....*E. helena* sp. nov.
  - Ladder mask confined to the scutal grooves (Figs 15A, 16A); femur IV curved, without a large dorso-apical tubercle or spine (Fig. 17G–I) .....8
8. Coda short, with constriction poorly marked, dorsal apophysis of coxa IV acuminate and with few minute granules (Figs 15A, 16A), patella of pedipalpus with a mesal keel without tubercles (Fig. 17F) .....*E. leda* sp. nov.
  - Coda large, with constriction well marked, dorsal apophysis of coxa IV rounded and widely granulated (Figs 27A, 28A), patella of pedipalpus with a mesal keel with a row of small setiferous tubercles (Fig. 29E) .....*E. scalaris* (Sørensen, 1932) comb. nov.

*Eulibitia castor* sp. nov.

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Figs 5–7, 34

**Diagnosis**

Paramedian tubercles of areas I, III and posterior margin of scutum acuminate (Fig. 5E), tubercles of posterior margin higher than wide and slanted backwards (Fig. 5A, D–E). Ladder mask only present in the scutal groove between areas I and II (Fig. 6A). Coda short and mid-bulge symmetrical (Fig. 6A), clavi inguines composed of two tubercles. DS shape is very similar to that in *E. pollux* sp. nov., but differs because it is slightly more slender and the paramedian tubercles of the posterior margin are separated, with independent basis.

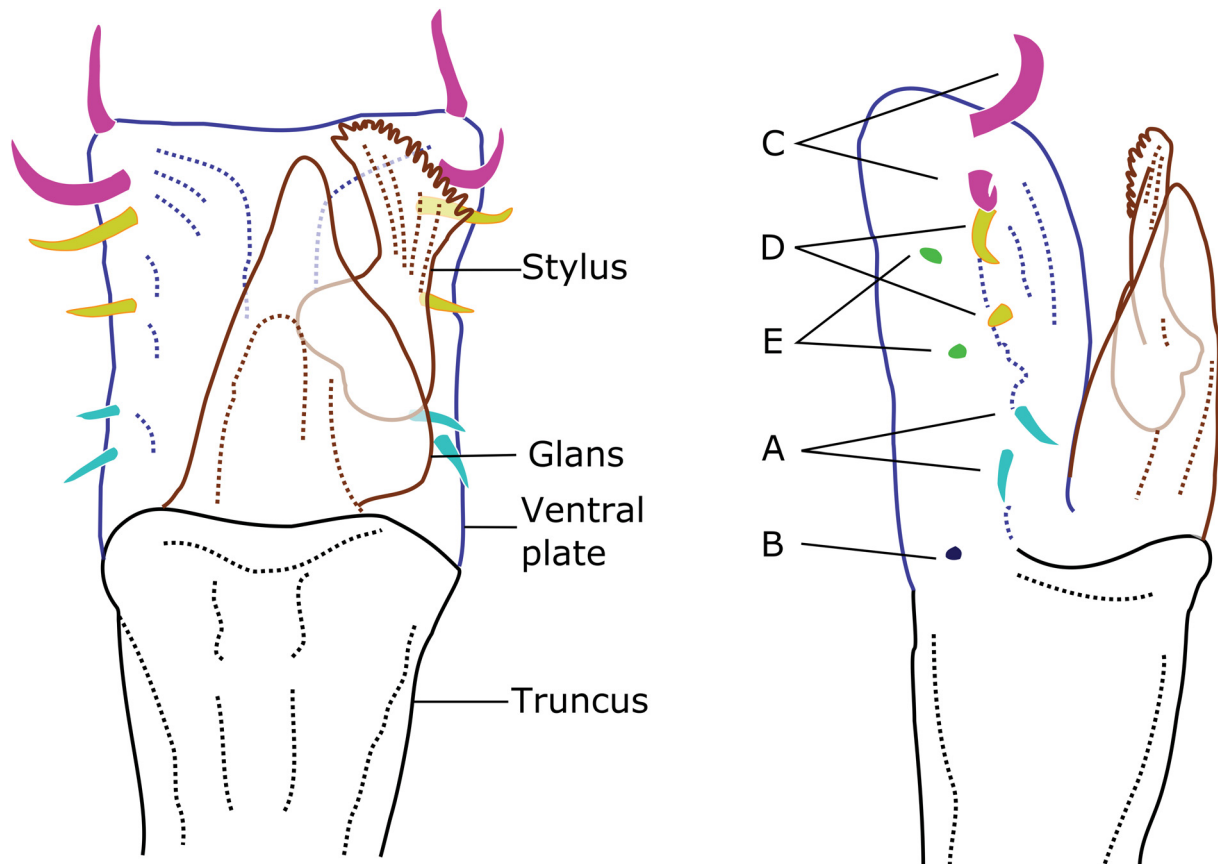
**Etymology**

Noun in apposition of Castor, son of Leda and Zeus, and twin of Pollux, from Greek mythology. Referring to the fact that this species and *E. pollux* sp. nov. are very similar to each other like the twins Castor and Pollux.

**Material examined**

**Holotype**

COLOMBIA: ♂, Boyacá, Pajarito, Corinto, Quebrada La Limona, 5°24'11.06" N, 72°44'34.88" W, 2 Sep. 1981, I. de Arévalo leg. (ICN-AO 79).



**Fig. 3.** Penis of *Eulibitia maculata* Roewer, 1912 (ICN-AO 875), dorsal and lateral view (from left to right) showing parts and interpretation of macrosetae, labeled with letters A–E.



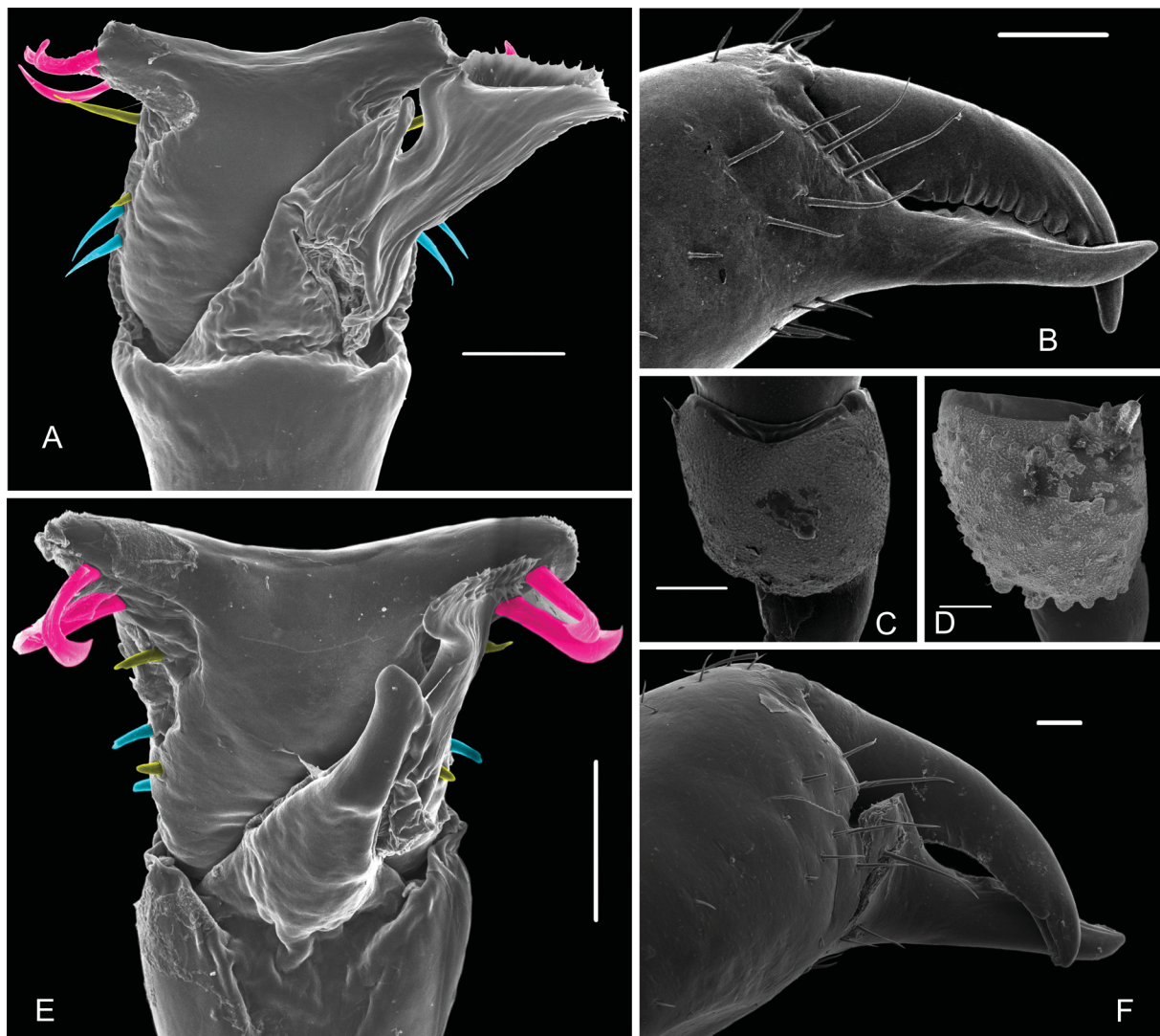
## Description

### Male

MEASUREMENTS. CL = 1.97, AL = 3.37, CW = 3.20, AW = 4.86, Fe IV = 5.51, Ti IV = 3.97.

DORSUM (Figs 5, 6A). Dorsal scutum beta-shaped, with symmetrical mid-bulge. Areas I, III and posterior margin of scutum with two paramedian acuminate tubercles. Lateral margins with irregular row of minute granules at mid-bulge. Posterior margin of scutum with row of small tubercles. Tergites with row of small tubercles and anal operculum finely granular.

VENTER (Fig. 5C–D). Free sternites finely granular; coxae II–IV finely and uniformly granular; coxa I with longitudinal row of tubercles and smooth area corresponding to lace area of pedipalp.

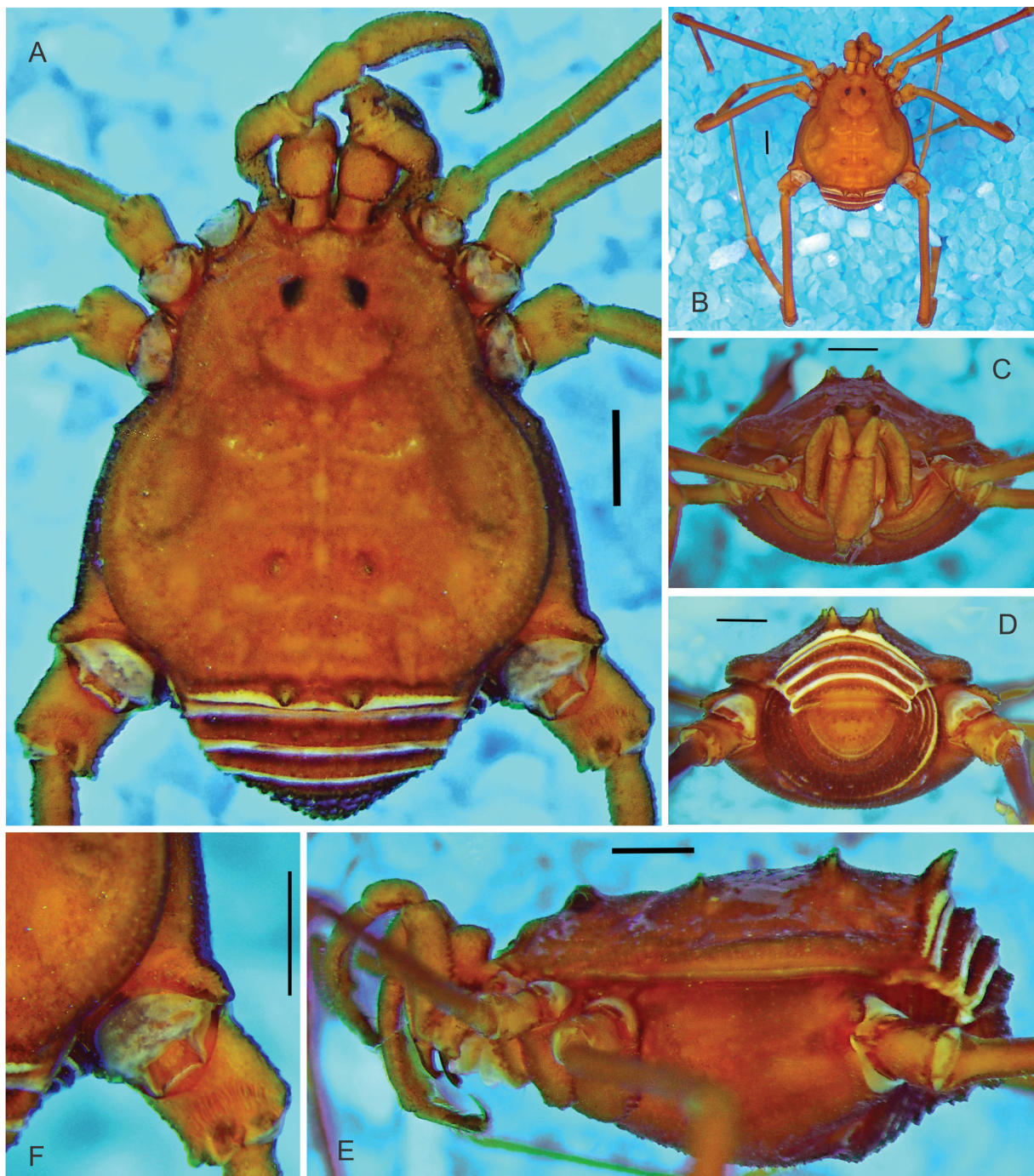


**Fig. 4.** Structures of presumed related species. – *Libitia cordata* (Gervais, 1844). A. Distal part of the penis, dorsal view (ICN-AO 413). B. Fingers of the hand of left chelicera (ICN-AO 1040). C. Left basichelicerite, dorsal view (ICN-AO 1040). – *Ambatoiella vigilans* Mello-Leitão, 1943. D. Left basichelicerite, dorsal view (MNRJ 2524). E. Distal part of the penis, dorsal view (MNRJ 19236). F. Fingers of the hand of left chelicera (MNRJ 2524). Macrosetae colors: fuchsia = MS C, yellow = MS D, aqua blue = MS A. Scale bars: A, E = 50µm; F = 100µm; B–D = 200µm.



**CHELICERAE** (Fig. 7F). Basichelicerite uniformly occupied with tubercles of different sizes, some basal and one mesodistal larger; movable finger with row of eleven tubercles, giving a serrated appearance, fixed finger with seven tubercles decreasing in size from basal to distal part of finger.

**PEDIPALPS** (Fig. 7D–E). Trochanter with strong ventral process. Femur with pronounced dorsal keel formed by fusion of six tubercles, with ventral row of nine setiferous tubercles and mesodistal process. Patella with mesal keel formed by six small tubercles.



**Fig. 5.** *Eulibitia castor* sp. nov., ♂, holotype (ICN-AO 79), habitus. **A.** Dorsal view. **B.** Panoramic, dorsal view. **C.** Frontal view. **D.** Posterior view. **E.** Lateral view. **F.** Detail of apical apophysis of coxa IV. Scale bars: 1 mm.

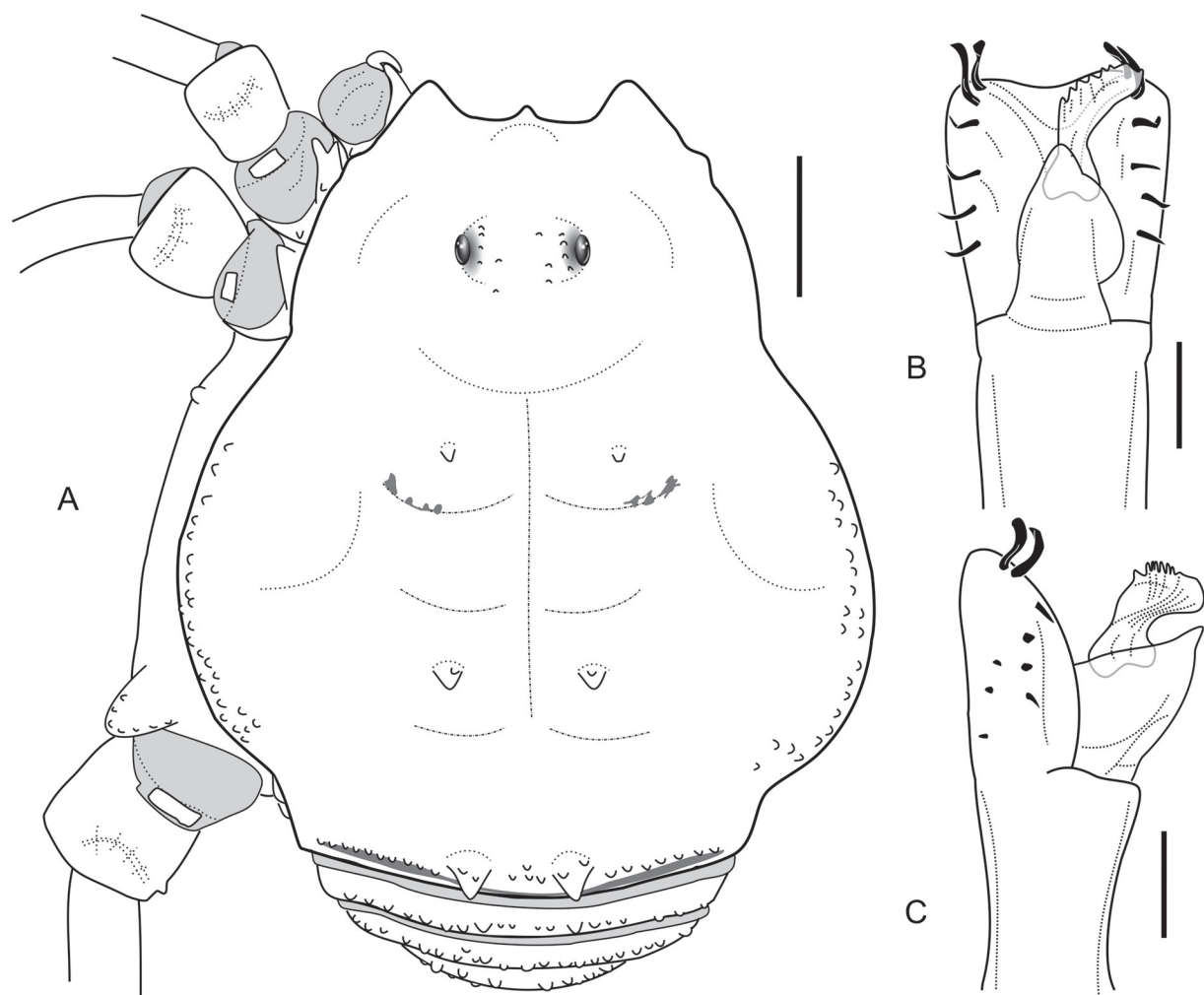
**LEGS** (Fig. 7A–C, G). Coxa IV granulated, with well-marked clavi inguines, distal apophysis of coxa IV slightly tuberculate and directed laterally. Trochanter IV with small retro-distal apophysis. Femur IV straight, with two longitudinal ventral rows of small tubercles along entire length, tubercles increasingly larger distally in prolateral row. Patella IV substraight, with small setiferous tubercles. Tarsal counts: 6(3)/14(3)/?–7/8.

**COLOR** (Fig. 5). Body and appendages background 48 (Vivid Orange) mottled in 74 (Strong Yellowish Brown), ladder mask 104 (Pale Greenish Yellow). Pedipalpus as well as trochanters and tarsomeres of legs 83 (Brilliant Yellow).

**GENITALIA** (Fig. 6B–C). Penis ventral plate subrectangular, narrower basally and distal border concave; dorsal apophysis of glans rounded, wattle long. Shapes and organization of macrosetae as follows: MS C1–C2 large, curved and flat; MS D1–D2 smaller than MS C and curved at apex; MS A1–A2 large, cylindrical, straight or slightly curved, located in middle of ventral plate; MS B and MS E1–E2 ventral, very small and immersed in microsetae. MS B located at basal fourth of VP.

### Female

Unknown.



**Fig. 6.** *Eulibitia castor* sp. nov., ♂, holotype (ICN-AO 79). **A.** Habitus, dorsal view. **B–C.** Apical portion of the penis: **B.** Dorsal view. **C.** Lateral view. Scale bars: A = 1 mm; B–C = 0.1 mm.



## Distribution

Only known from the type locality, in the WWF ecoregion Cordillera Oriental montane forest (NT0118), tropical and subtropical moist broadleaf forest biome, in Boyacá Department (Fig. 34).

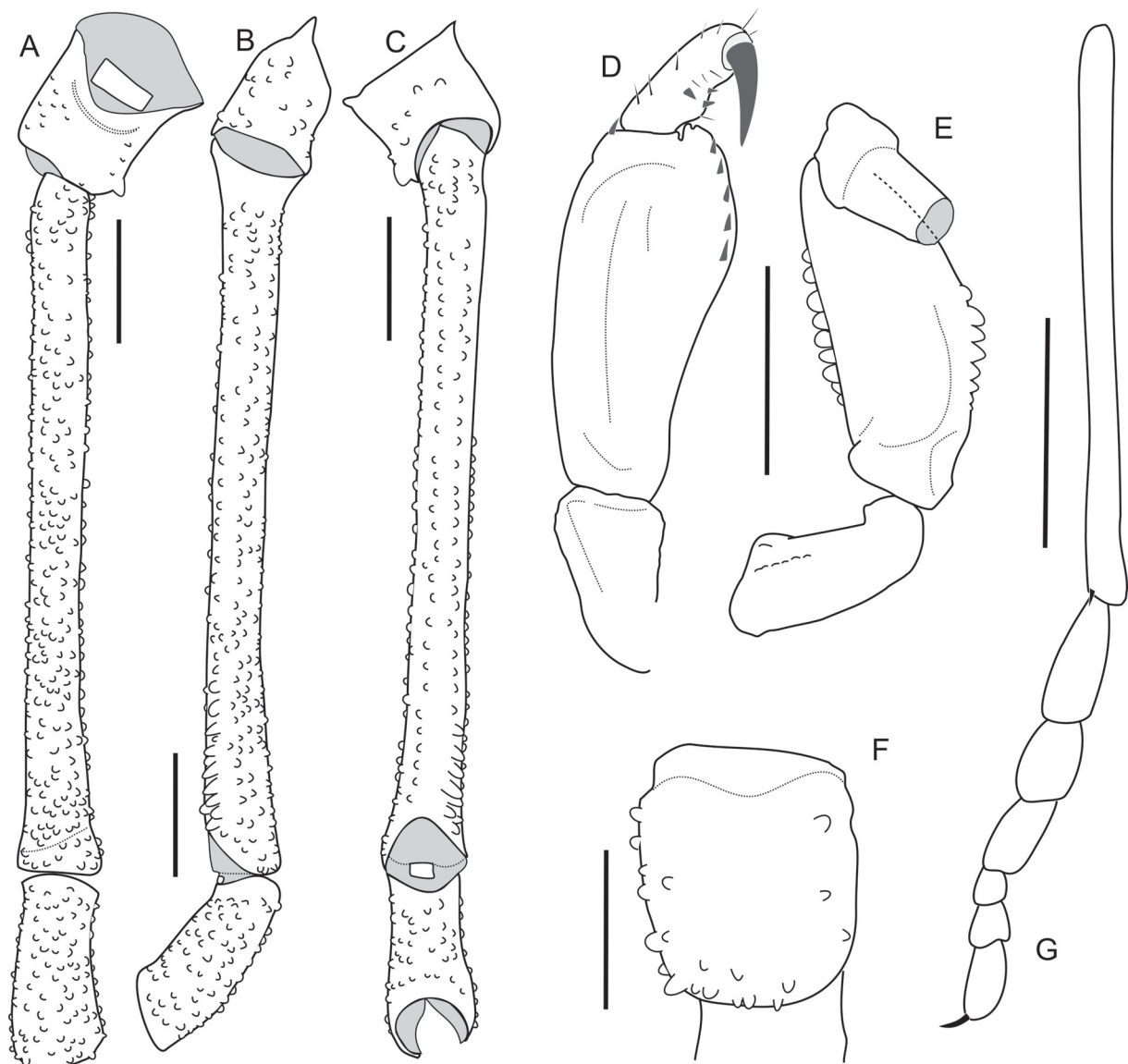
## *Eulibitia clytemnestra* sp. nov.

[urn:lsid:zoobank.org:act:3AB34A1C-1F3F-4748-859F-80D4C759152E](http://urn:lsid:zoobank.org:act:3AB34A1C-1F3F-4748-859F-80D4C759152E)

Figs 8–10, 33

## Diagnosis

Paramedian tubercles of posterior margin of scutum rounded and contiguous, other areas finely granulated, without tubercles (Fig. 9A). Ladder mask only present in area II, entering only a little into



**Fig. 7.** *Eulibitia castor* sp. nov., ♂, holotype (ICN-AO 79). **A.** Left femur and trochanter IV, dorsal view. **B.** Same, prolateral view. **C.** Same, ventral view. **D.** Left pedipalpus, tibia and tarsus in ventral view. **E.** Same, femur and patella in mesal view. **F.** Left chelicera, dorsal view. **G.** Left tibia and tarsomeres of leg I, prolateral view. Scale bars: 1 mm.

scutal grooves (Fig. 8A). Differs from other species of the genus because of the smooth lateral margins (Fig. 9A). Coda very short and mid-bulge asymmetrical, coxa IV slightly granulated, without clavi inguines (Figs 8A, 9A). Femur IV straight, without conspicuous ornamentation (Figs 8D, F, 10A–C).

### Etymology

Noun in apposition from Clytemnestra, daughter of Leda and sister of Helen of Troy, from Greek mythology. Two of the new species of *Eulibitia* have been named after Helen and Clytemnestra to complete the four siblings originating from the union of Zeus and Leda.



**Fig. 8.** *Eulibitia clytemnestra* sp. nov., ♂, holotype (ICN-AO 1148), habitus. **A.** Dorsal view. **B.** Frontal view. **C.** Posterior view. **D.** Panoramic, dorsal view. **E.** Lateral view. **F.** Detail of apical distal part of femur IV and trochanter. Scale bars: 1 mm.

## Material examined

### Holotype

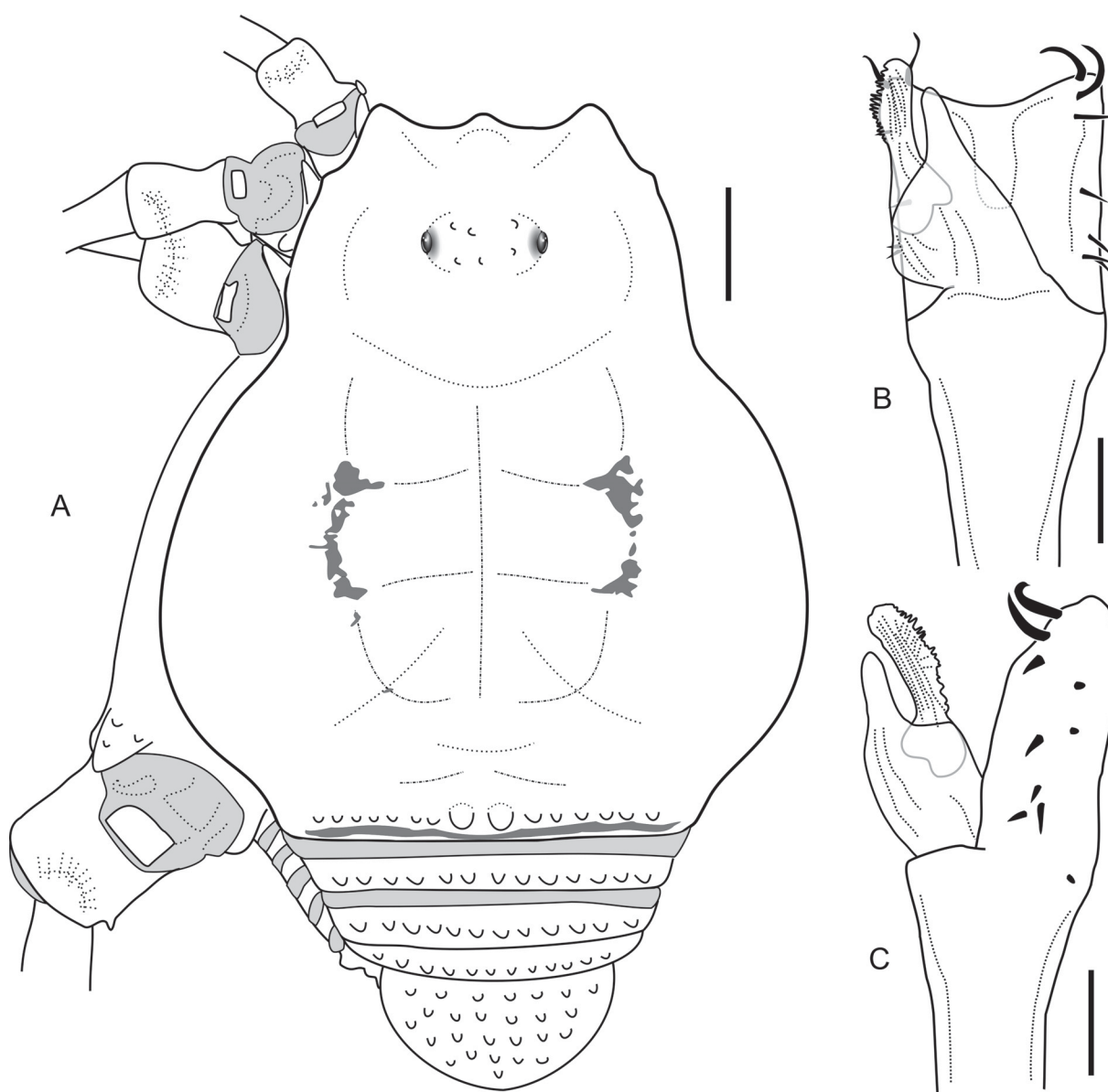
COLOMBIA: ♂, Santander Department, Encino, La Sierra, SFF Guanentá-Alto Río Fonce, 6°0'27.33" N, 73°08'56.02" W, 2450–2600 m a.s.l., 10 Jan. 2002, gallery forest, pitfall, S. Arias leg. (ICN-AO 1148).

## Description

### Male

MEASUREMENTS. CL = 2.52, AL = 4.29, CW = 3.71, AW = 6.05, Fe IV = 6.67, Ti IV = 5.54.

DORSUM (Figs 8, 9A). Dorsal scutum beta-shaped, with asymmetrical mid-bulge. Posterior margin of scutum with two paramedian rounded tubercles. Lateral margins of scutum smooth. Posterior margin



**Fig. 9.** *Eulibitia clytemnestra* sp. nov., ♂, holotype (ICN-AO 1148). **A.** Habitus, dorsal view. **B–C.** Apical portion of penis. **B.** Dorsal view. **C.** Lateral view. Scale bars: A = 1 mm; B–C = 0.1 mm.

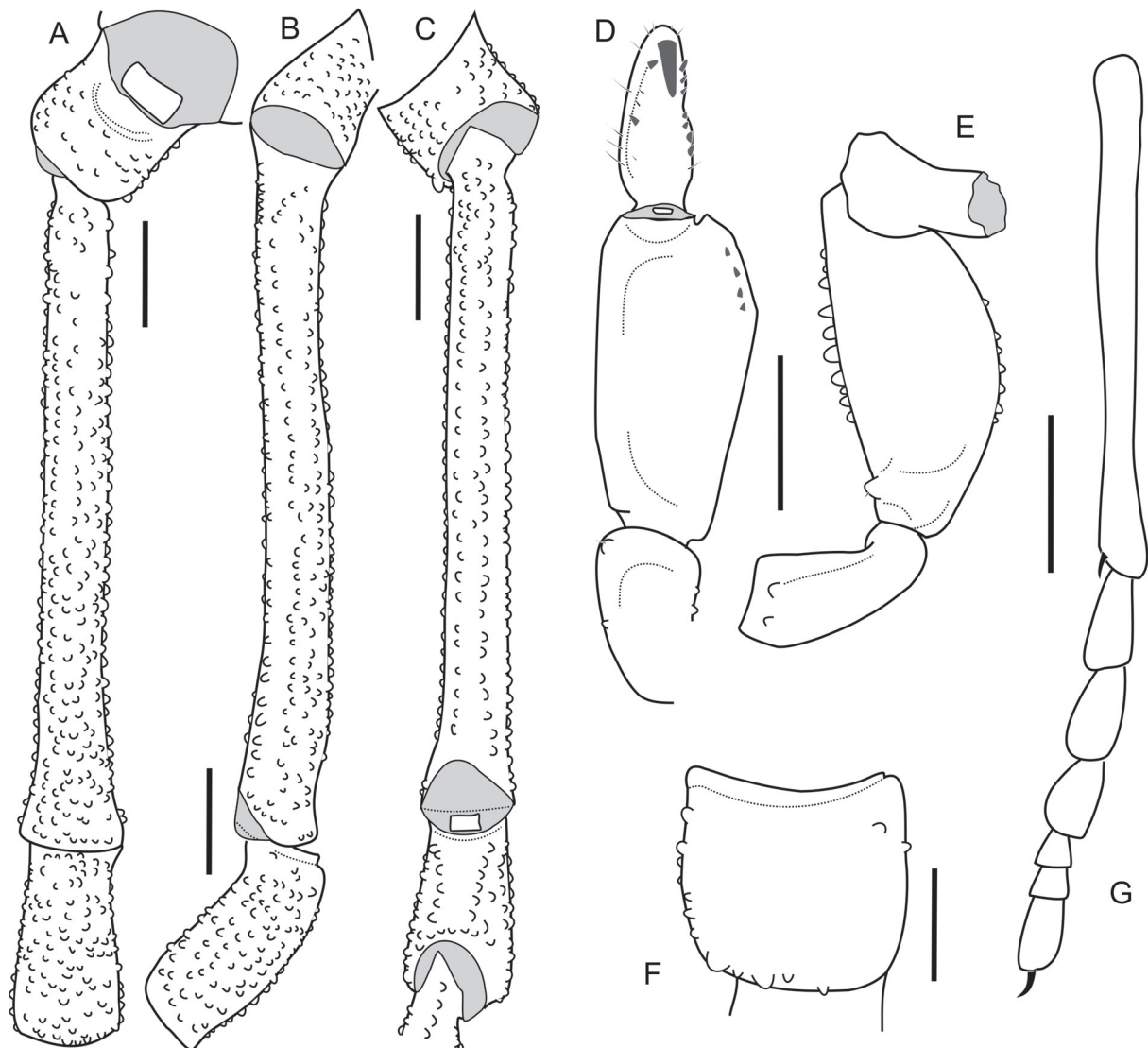


of scutum with row of small tubercles. Tergites with row of small tubercles and anal operculum finely granular.

**VENTER** (Fig. 8C, E). Free sternites finely granular; coxae II–IV finely and uniformly granular; coxa I with longitudinal row of tubercles and smooth area corresponding to locking area of Pp Tr.

**CHELICERAE** (Fig. 10F). Basichelicerite with minute tubercles on ecto-basal side and two on antero-mesal corner; movable finger with row of tubercles, giving a serrated appearance, and large basal tubercle; fixed finger with five tubercles decreasing in size from basal to distal part of finger.

**PEDIPALPS** (Fig. 10D–E). Trochanter with strong ventral process. Femur with pronounced dorsal row of seven tubercles, with ventral row of ten setiferous tubercles and mesodistal process. Patella with low mesal keel.



**Fig. 10.** *Eulibitia clytemnestra* sp. nov., ♂, holotype (ICN-AO 1148). **A.** Left femur and trochanter IV, dorsal view. **B.** Same, prolateral view. **C.** Same, ventral view. **D.** Left pedipalpus, tibia and tarsus in ventral view. **E.** Same, femur and patella in mesal view. **F.** Left chelicera, dorsal view. **G.** Left tibia and tarsomeres of leg I, prolateral view. Scale bars: 1 mm.

LEGS (Figs 8F, 10A–C, G). Coxa IV finely granulated, without clavi inguines, distal apophysis of coxa IV slightly tuberculate and directed laterally. Trochanter IV with small retro-distal apophysis. Femur IV straight, with two longitudinal ventral rows of small tubercles along entire length. Patella IV substraight, with small tubercles. Tarsal counts: 6(3)/12–11(3)/7–?/8.

COLOR (Fig. 8). Body and appendages color background 68 (Strong Orange Yellow), ladder mask 104 (Pale Greenish Yellow). Trochanter and tarsomeres 98 (Brilliant Greenish Yellow).

GENITALIA (Fig. 9B–C). Ventral plate subrectangular, narrower basally and distal border hardly concave; dorsal apophysis of glans long and rounded, wattle long. Shapes and organization of macrosetae as follows: MS C1–C2 large, curved and flat; MS D1–D2 large and straight, D2 smaller than D1 and located closer to MS A1; MS A1–A2 large, cylindrical, straight, located in basal middle of ventral plate (asymmetry in number of MS A already seen in *E. maculata*); MS B and MS E1–E2 ventral, very small and immersed in microsetae. Pair of MS B at base of ventral plate.

#### Female

Unknown.

#### Distribution

Only known from the type locality, in the WWF ecoregion Magdalena Valley montane forests (NT0136), tropical and subtropical moist broadleaf forest biome, in Santander Department (Fig. 33).

*Eulibitia ectroxantha* (Mello-Leitão, 1941) comb. nov., *species inquirenda*  
Fig. 34

*Brachylibitia ectroxantha* Mello-Leitão, 1941: 166, fig 1.

*Cynorta ectroxantha* – Goodnight & Goodnight 1953: 38.

*Brachylibitia ectroxantha* – Kury 2003: 38.

*Platymessa ectroxantha* – Medrano & Kury 2016: 57 (tagged as *species inquirenda*).

#### Diagnosis

Paramedian tubercles of posterior margin of scutum acuminate. Differs from other species of the genus in the presence of paramedian tubercles in area III but without any armature in area I, and the ladder mask with rungs only, no rails in scutal grooves I, II and III (see Mello-Leitão 1941 and Medrano & Kury 2016).

#### Etymology

From the Greek ἐκτρανύω (signify clearly) + ξανθός (yellow).

#### Type data

Whereabouts of type(s) unknown, probably once deposited in MNRJ, now lost. Type locality: Colombia, Boyacá Department, La Uvita [06°17' N, 72°30' W].

#### Remarks

This species was discussed and tagged as *species inquirenda* in Medrano & Kury (2016) and the available information is sufficient to include it within the new diagnosis of *Eulibitia*.

***Eulibitia h-inscriptum* (Mello-Leitão, 1941) comb. nov.**

Fig. 32

*Platymessa h-inscripta* Mello-Leitão, 1941: 167, fig 2.

*Platymessa nigrolimbata* Mello-Leitão, 1941: 168, fig 3 (junior subjective synonym of *Platymessa h-inscripta* according to Medrano & Kury 2016).

*Platymessa nigrolimbata* – B. Soares 1945: 344. — Kury 2003: 81.

*Cynorta h-inscripta* – H. Soares 1970: 325.

*Platymessa h-inscripta* – Kury 2003: 81.

*Platymessa h-inscriptum* – Kury & Alonso-Zarazaga 2011: 51. — Medrano & Kury 2016: 58, figs 1–29.

**Diagnosis**

*E. h-inscriptum* has a pair of paramedian tubercles in areas I, III and on the posterior margin, but differs from its congeners because its ladder mask is not confined to the mesotergum, reaching the lateral margins of the scutum.

**Material examined**

**Holotypes**

COLOMBIA: ♂, Santander Department, Espinal (holotype of *Platymessa h-inscripta*, MNRJ 282).

COLOMBIA: ♀, Santander Department, San Gil (holotype of *Platymessa nigrolimbata*, MNRJ 463).

**Paratypes**

COLOMBIA: 2 ♂♂, 1 ♀, Boyacá Province, La Uvita (paratypes of *Platymessa nigrolimbata*, MNRJ 58).

**Other material**

COLOMBIA: 1 ♂, 11 ♀♀, Boyacá Department, Tipacoque, Vereda La Calera, 6°23.8'91" N, 72°43.4'10" W, 2800 m a.s.l., 1–5 Apr. 2013, M. Medrano leg. (ICN-AO 1186); 1 ♂, 2 ♀♀, Santander Province, Zapatoca, Vereda La Cacica, Reserva La Montaña Mágica, 6°50.044' N, 73°18.241' W, 1964 m a.s.l., 6 Nov. 2013, C. Perafán and D. Martínez leg. (ICN-AO 1384).

**Remarks**

This species was recently redescribed by Medrano & Kury (2016) and their morphological features match the new diagnosis of *Eulibitia*.

***Eulibitia helena* sp. nov.**

[urn:lsid:zoobank.org:act:24196992-FBD8-405D-8F75-DFCF7F811D97](http://urn:lsid:zoobank.org:act:24196992-FBD8-405D-8F75-DFCF7F811D97)

Figs 11–14, 34; Table 1

**Diagnosis**

Paramedian rounded tubercles in areas I, III and posterior margin of scutum, other areas finely granulated, without tubercles (Fig. 12A). Coda short and mid-bulge slightly asymmetrical (Fig. 12A), coxa IV finely granulated, with well-marked clavi inguines (Fig. 12A). Differs from other species of the genus because the ladder mask rails and rungs overflow the scutal grooves to reach areas I, II and III (Fig. 11A), and because femur IV is straight in dorsal view, with a large dorso-apical spine (Figs 11B, 12C–E).



### Etymology

Noun in apposition for Helen of Troy, daughter of Leda and cause of the Trojan War in Greek mythology.

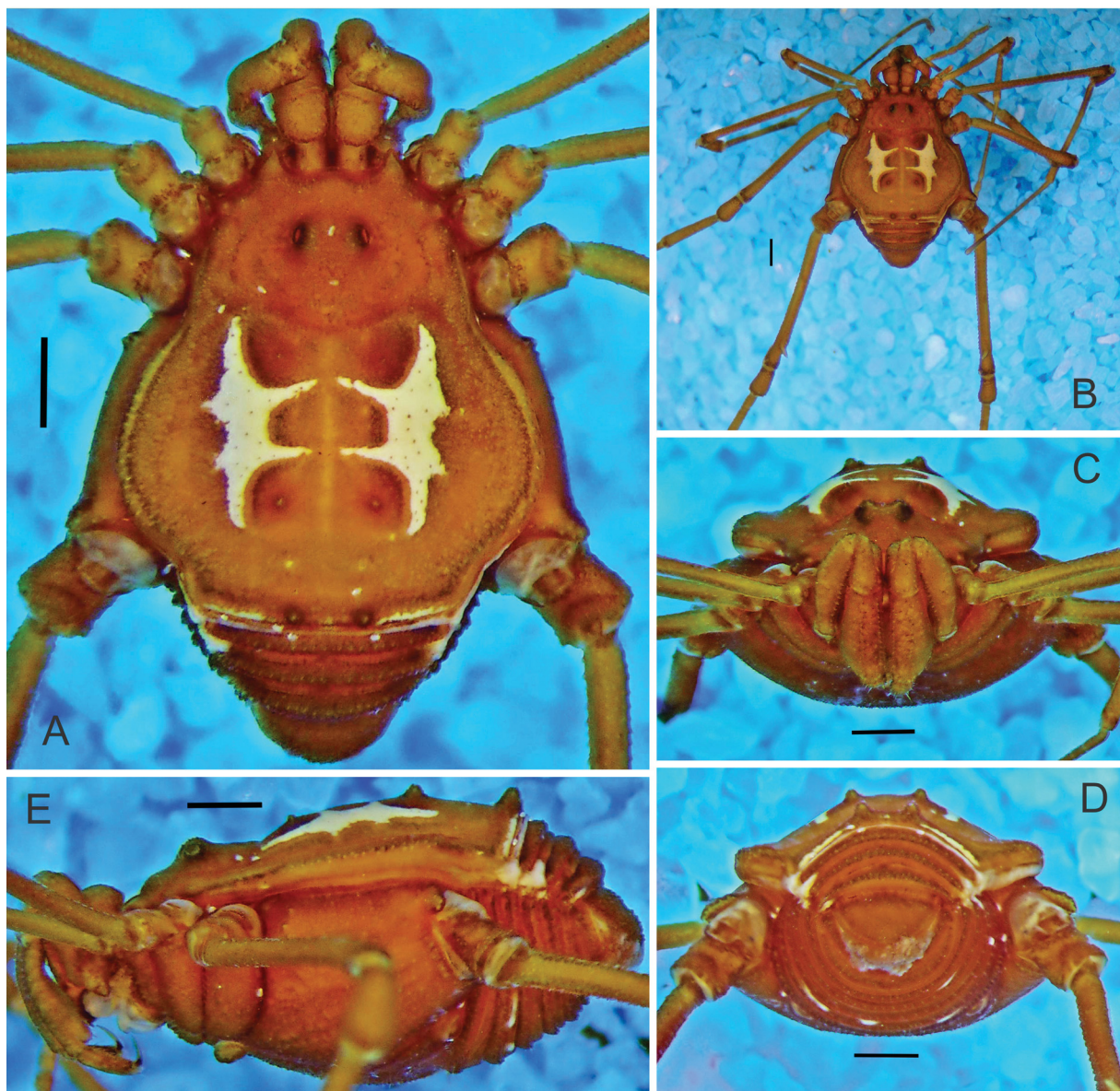
### Material examined

#### Holotype

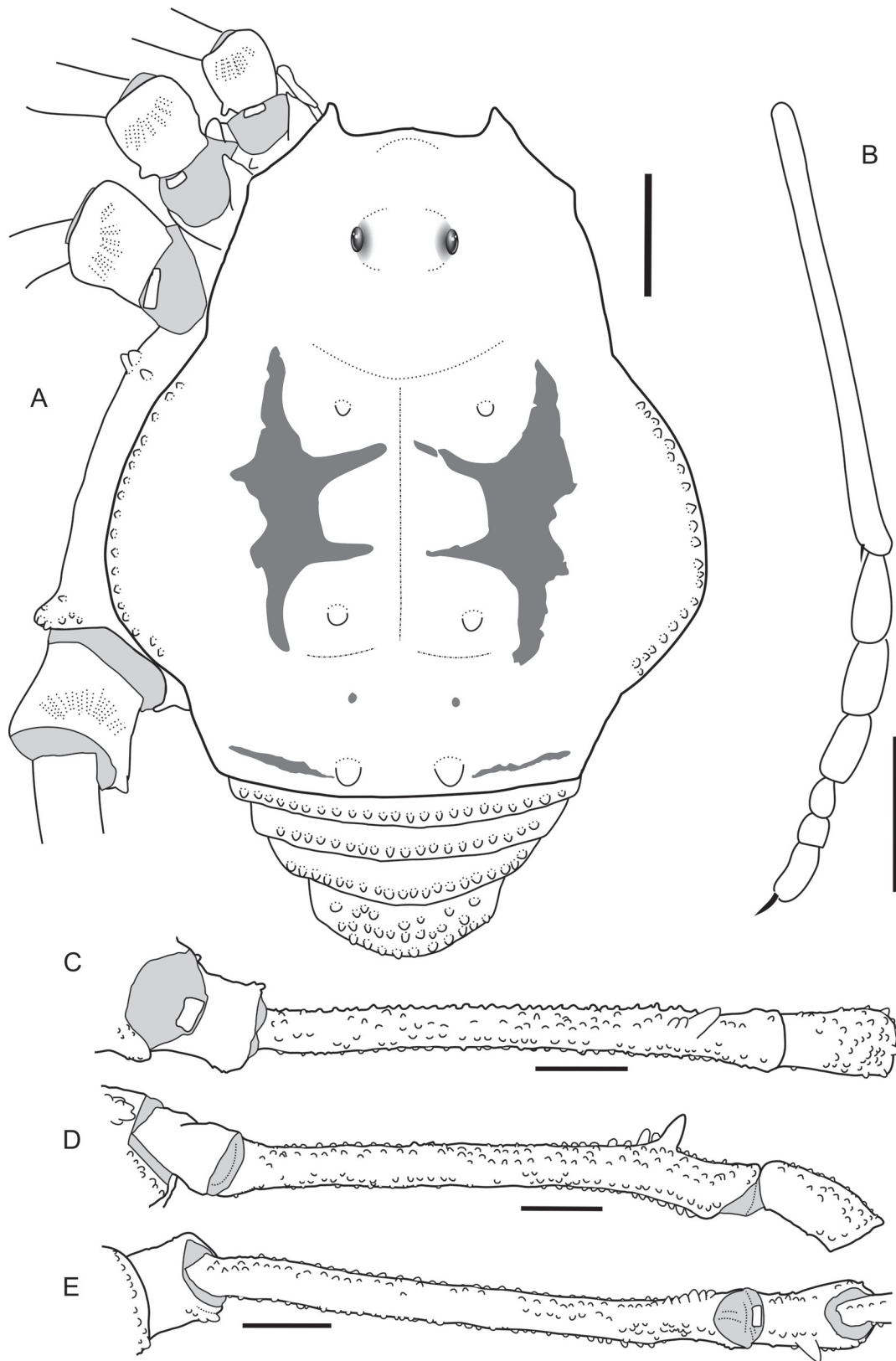
COLOMBIA: ♂, Norte de Santander Department, Cucutilla, Vereda Carrizal, Sector Sisavita, Quebrada Poveda [7.406° N, 72.836° W, 2040 m a.s.l.] (IAvH 45).

#### Paratypes

COLOMBIA: 1 ♂, same collection data as for holotype (IAvH 38); 3 ♀♀, same collection data as for holotype (IAvH 25, IAvH 32, IAvH 51); 1 ♀, Santander Department, Suaita, San José de Suaita, Bosque



**Fig. 11.** *Eulibitia helena* sp. nov., ♂, holotype (IAvH 45), habitus. **A.** Dorsal view. **B.** Panoramic, dorsal view. **C.** Frontal view. **D.** Posterior view. **E.** Left lateral view. Scale bars: 1 mm.



**Fig. 12.** *Eulibitia helena* sp. nov., ♂, holotype (IAvH 45). **A.** Habitus, dorsal view. **B–D.** Left femur and trochanter. **B.** Dorsal view. **C.** Prolateral view. **D.** Ventral view. **E.** Left metatarsus and tarsomeres of leg I, prolateral view. Scale bars: 1 mm.



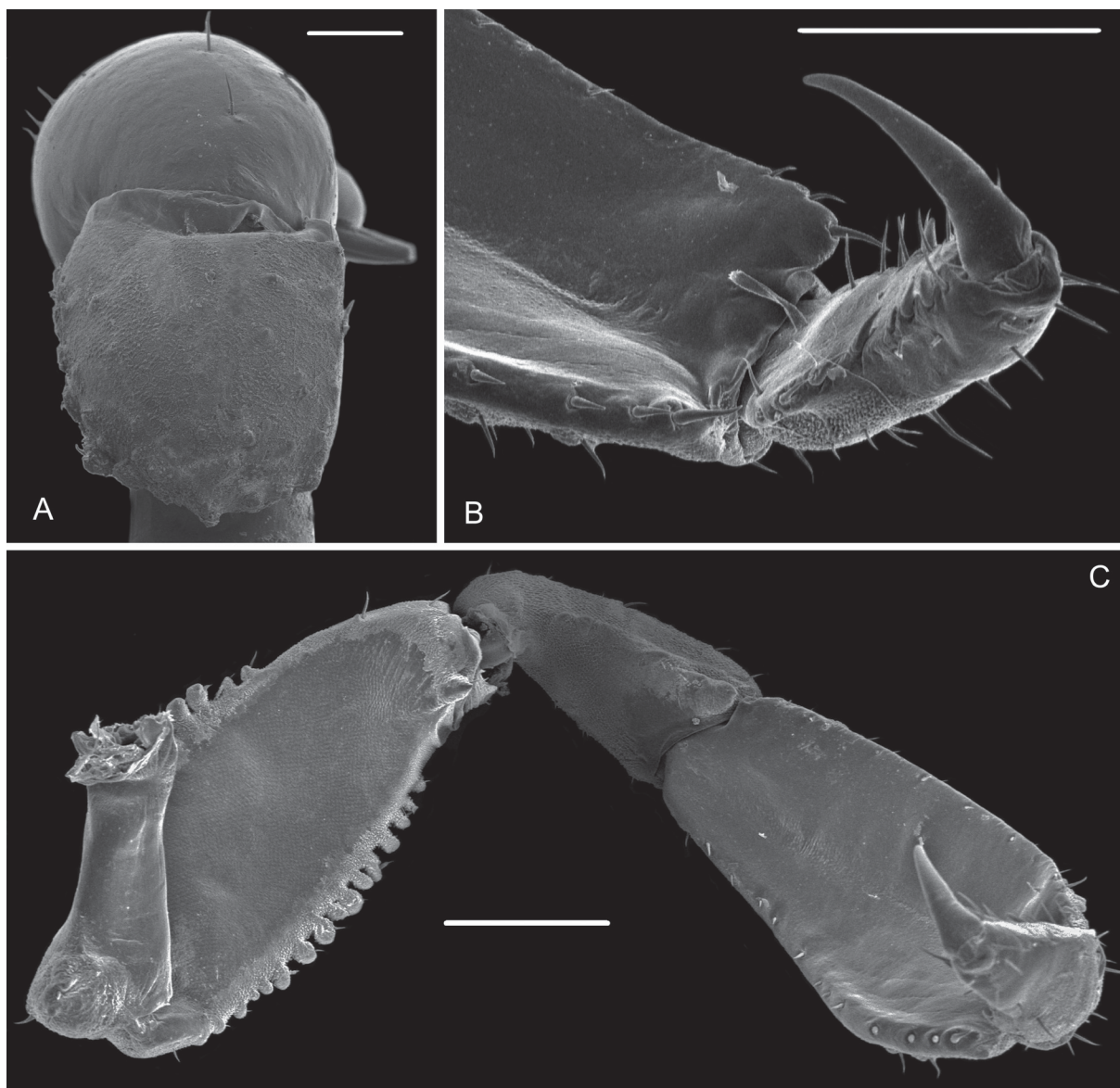
de la Fundación San Cipriano [6.167° N, 73.423° W], 1780 m a.s.l., 3 Jul. 2014, Jameo, C. Romero and D. Martínez leg. (ICN-AO 1429).

### Description

**Male** (based on holotype)

MEASUREMENTS. CL = 1.70, AL = 3.59, CW = 3.01, AW = 4.81, Fe IV = 6.08, Ti IV = 3.90.

DORSUM (Figs 11, 12A). Dorsal scutum beta-shaped, with slightly asymmetrical mid-bulge. Areas I, III and posterior margin with two paramedian rounded tubercles. Lateral margins of scutum irregularly granulate. Posterior margin of scutum with row of small tubercles. Tergites with row of small tubercles and anal operculum finely granular.



**Fig. 13.** *Eulibitia helena* sp. nov., ♂, paratype (IAvH 38). **A.** Left chelicera, dorsal view. **B.** Detail of tarsus and tarsal claw of left pedipalpus, ventro-apical view. **C.** Left pedipalpus, mesal view. Scale bars: A = 200  $\mu$ m; B–C = 500  $\mu$ m.

**VENTER** (Fig. 11C–E). Free sternites finely granular; coxae II–IV finely and uniformly granular; coxa I with longitudinal row of tubercles and smooth area corresponding to lace area of pedipalp.

**CHELICERAE** (Fig. 13A). Basichelicerite with small tubercles on dorsal surface and some larger ones on ecto-basal side, movable finger with row of ten small tubercles, giving a serrated appearance; fixed finger with five tubercles, decreasing in size from basal to distal part of finger.

**PEDIPALPS** (Fig. 13B–C). Trochanter with strong ventral process. Femur with pronounced dorsal row of seven tubercles, with ventral row of fifteen setiferous tubercles and mesodistal process. Patella with low mesal keel ending in setiferous tubercle.

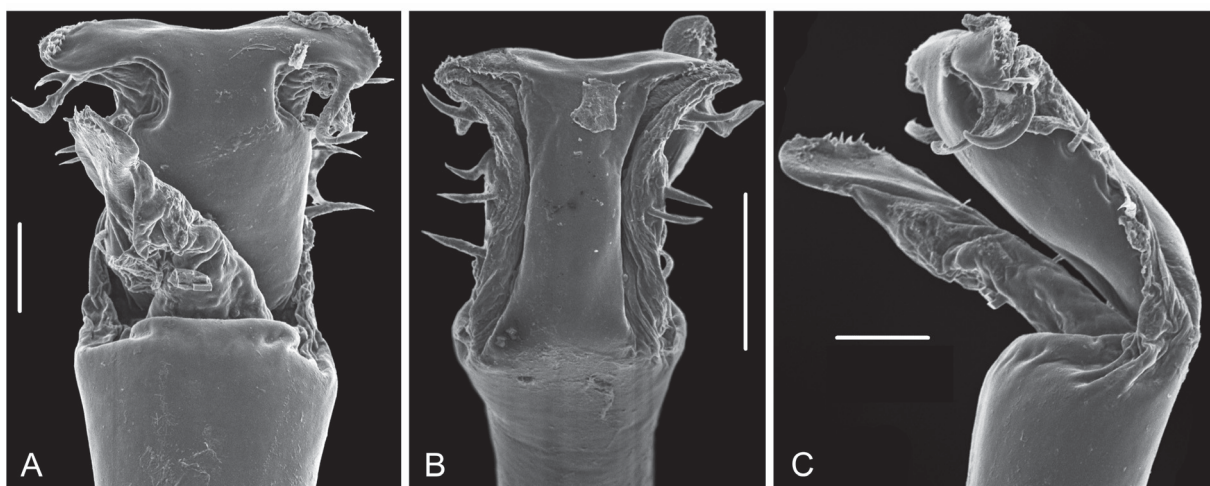
**LEGS** (Fig. 12B–E). Coxa IV finely granulated, with clavi inguines, distal apophysis of coxa IV slightly tuberculate and directed laterally. Trochanter IV with small retro-distal apophysis. Femur IV straight, with two longitudinal ventral rows of small tubercles along entire length, dorsal row of tubercles increasing in size, with large apical spine. Patella IV substraight, with small tubercles. Tarsal counts: 6(3)/14–?(3)/7/8.

**COLOR** (Fig. 11). Body color background 49 (Brilliant Orange), ladder mask 104 (Pale Greenish Yellow). Appendages 67 (Brilliant Orange Yellow).

**GENITALIA** (Fig. 14). Ventral plate subrectangular, narrower basally and distal border substraight, dorso-apical membranous invaginations basal to MSC; dorsal apophysis of glans long and rounded, wattle long. Shapes and organization of macrosetae as follows: MS C1–C2 large, curved and flat; MS D1–D2 large and straight, D2 smaller than D1 and located closer to MS A1; MS A1–A2 large, cylindrical, straight, located on basal middle of ventral plate; MS B and MS E1–E2 ventral, very small and immersed in microsetae. Pair of MS B at base of ventral plate.

### Variation

There is a limited sample of blots ( $n = 7$ ), the parallel bars (rails) may be more or less wide and the posterior stripe is sometimes interrupted by the paramedian tubercles (Figs 11A, 12A). The dorso-distal tubercle of Fe IV may seem bifurcate by the growth of the tubercles of its own base. Tarsal counts: 5–6; 8–12; 5–6; 6–7. Variation of measurements is given in Table 1.



**Fig. 14.** *Eulibitia helena* sp. nov., ♂, paratype (IAvH 38). **A.** Distal view of penis, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. Scale bars: A, C = 50  $\mu$ m; B = 100  $\mu$ m.

**Table 1.** Measurements of body and appendages of *Eulibitia helena* sp. nov.

	IAvH 25 (♀)	ICN-AO 1429 (♀)	IAvH 45 (♂)	IAvH 38 (♂)
CL	1.57	1.56	1.70	2.02
AL	3.48	3.19	3.59	3.57
CW	2.97	2.73	3.01	3.12
AW	4.61	4.49	4.81	4.85
Fe I	2.61	3.45	2.98	3.23
Ti I	1.91	2.07	1.97	2.02
Fe II	5.31	7.50	5.85	6.26
Ti II	4.18	5.67	4.54	4.64
Fe III	4.27	5.15	4.65	4.92
Ti III	2.43	2.13	2.70	2.71
Fe IV	5.42	6.55	6.08	6.40
Ti IV	3.55	4.04	3.90	4.08

**Female**

Clavi inguines larger than in male. Basitarsomeres in legs I thickened but not swollen (Fig. 12B).

**Distribution**

*E. helena* sp. nov. occurs in two WWF ecoregions: (1) Magdalena Valley montane forests (NT0136), tropical and subtropical moist broadleaf forest biome, in Santander Department, and (2) Cordillera Oriental montane forest (NT0118), tropical and subtropical moist broadleaf forest biome, in Norte de Santander Department (Fig. 34).

***Eulibitia leda* sp. nov.**

[urn:lsid:zoobank.org:act:C2EE6C34-F8EE-4327-B88B-4565A06D09FE](http://urn:lsid:zoobank.org:act:C2EE6C34-F8EE-4327-B88B-4565A06D09FE)

Figs 15–18, 33; Table 2

**Diagnosis**

Paramedian rounded tubercles widely separated in areas I, III and IV (Figs 15, 16A). Ectal borders of protoglyphs conspicuous, triangular and sharp (Figs 15A, 16A). Coda short and wide (Fig. 15A). Clavi inguines large (Fig. 15A), basichelicerite with large tubercles in the basal part (Fig. 17B). Pedipalpal femur wider at half length (Fig 17E).

This species is very similar to *E. scalaris* in the shape of the ladder mask, but differs by having a short coda with the constriction poorly marked (Fig. 15A), the basichelicerite bears larger tubercles (Figs 15A, 17B) and the femur of leg IV is more tuberculated in the ventro-distal region (Fig. 17G–H, J). Apophyses of coxa IV acuminate and poorly tuberculated (Figs 15, 16A).

**Etymology**

Noun in apposition of Leda, mother of Clytemnestra, Castor, Pollux and Helen of Troy, from Greek mythology. This species has been named Leda to round up the family formed from the union of Zeus and Leda.



## Material examined

### Holotype

COLOMBIA: ♂, Santander Department, San Gil, Vereda Resumidero, road to Mogotes, 6°32'28.25" N, 73°05'28.75" W, 1600 m a.s.l., 30 Mar. 2013, A. García leg. (ICN-AO 1165).

### Paratypes

COLOMBIA: 5 ♂♂, 5 ♀♀, same collection data as for holotype (ICN-AO 1165.1); 1 ♂, 1 ♀, same collection data as for holotype (MNRJ 9264).



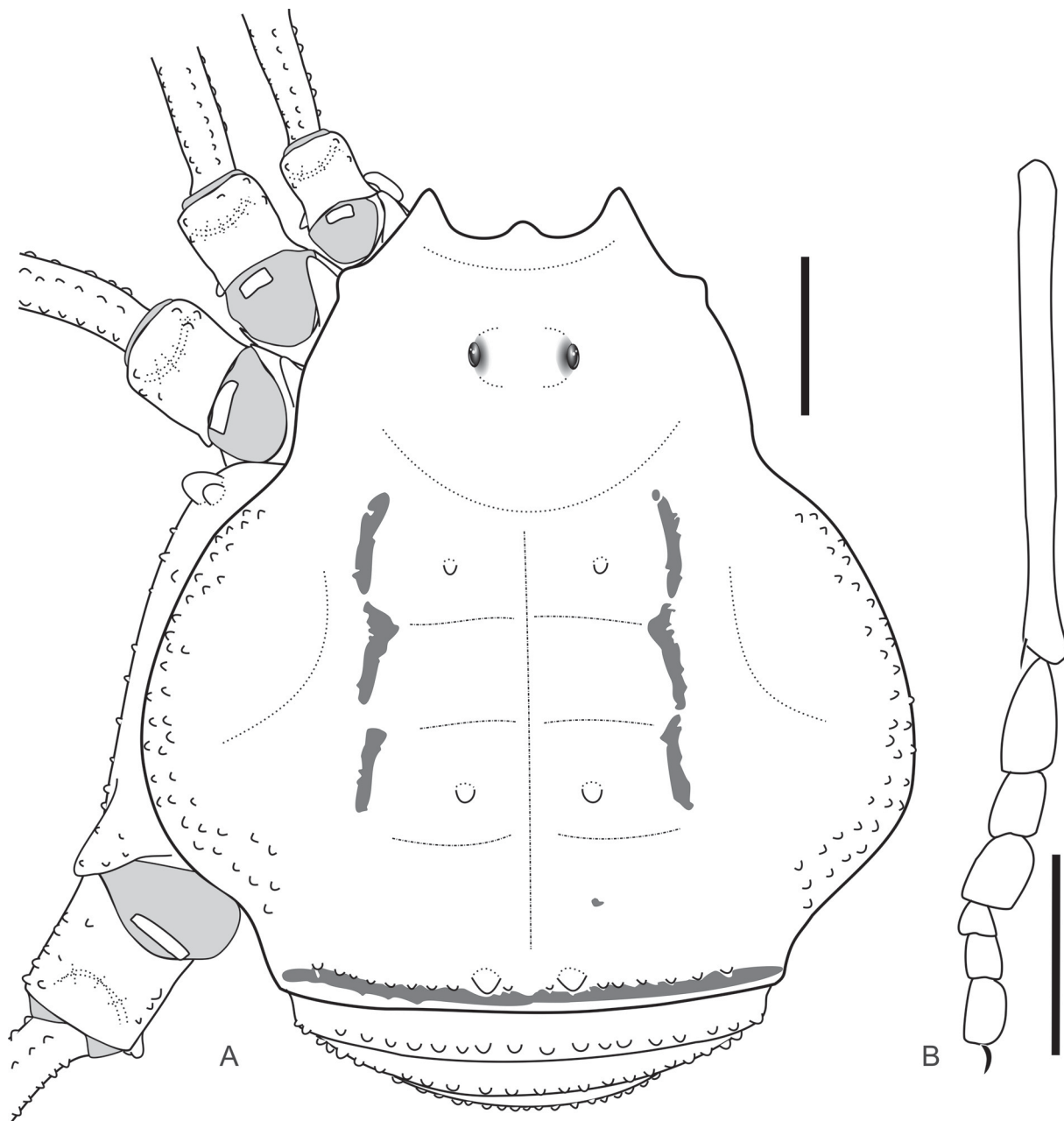
**Fig. 15.** *Eulibitia leda* sp. nov., ♂, holotype (ICN-AO 1165), habitus. **A.** Dorsal view. **B.** Panoramic, dorsal view. **C.** Frontal view. **D.** Posterior view. **E.** Lateral view. Scale bars: 1 mm.

## Description

**Male** (based on holotype)

MEASUREMENTS. CL = 2.11, AL = 3.29, CW = 3.11, AW = 5.08, Fe IV = 5.19, Ti IV = 3.41.

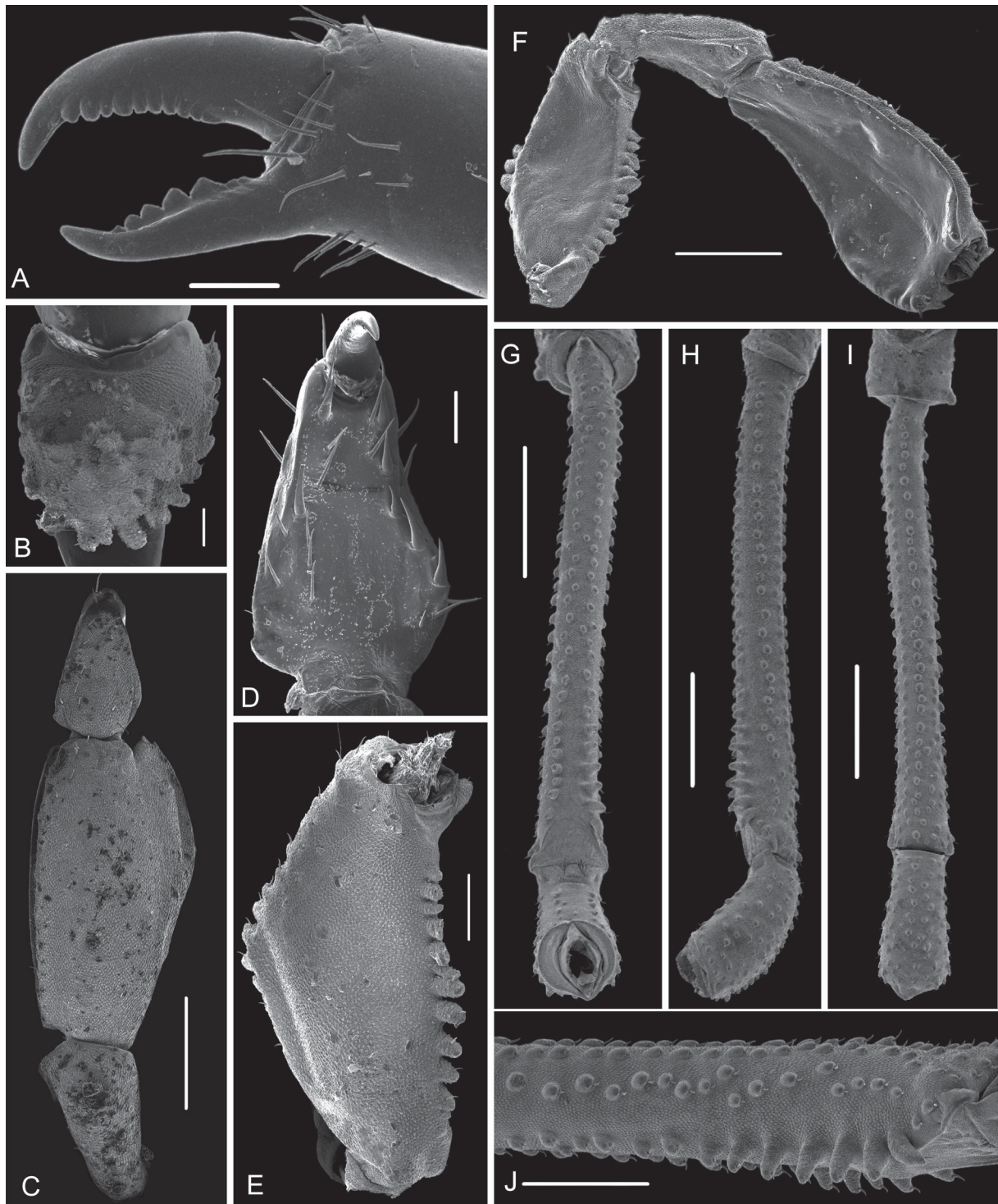
**DORSUM** (Figs 15, 16A). Dorsal scutum beta-shaped, with asymmetrical mid-bulge. Areas I, III and posterior margin with two paramedian tubercles, tubercles of posterior margin bifid. Lateral margins with irregular row of minute granules at mid-bulge. Posterior margin of scutum with row of small tubercles. Tergites with row of small tubercles and anal operculum finely granular.



**Fig. 16.** *Eulibitia leda* sp. nov., ♂, holotype (ICN-AO 1165). **A.** Habitus in dorsal view. **B.** Left Mt and Ta of leg I, prolateral view. Scale bar: 1 mm.



VENTER (Fig. 15D–E). Free sternites finely granular; coxae II–IV finely and uniformly granular; coxa I with longitudinal row of tubercles and smooth area corresponding to lace area of pedipalp.



**Fig. 17.** *Eulibitia leda* sp. nov., ♂, paratype (ICN-AO 1165.1). **A.** Fingers of hand of right chelicera. **B.** Right basichelicerite, dorsal view. **C.** Patella and tibia of right pedipalpus, dorsal view. **D.** Left pedipalpal tarsus. **E.** Femur of right pedipalpus, ectal view. **F.** Left pedipalpus, mesal view. **G.** Femur and patella of left leg, ventral view. **H.** Same, prolateral view. **I.** Same, dorsal view. **J.** Same, detail of distal part, prolateral view. Scale bars: A–B, D=100 µm; C, F, J=500 µm; E=200 µm (E); G–I=1 mm.

**CHELICERAE** (Fig. 17A–B). Basichelicerite with row of large tubercles from posterior border to ectal side; movable finger with row of ten tubercles, fixed finger with two small basal tubercles and five large tubercles decreasing in size from basal to distal part of finger.

**PEDIPALPS** (Fig. 17C–F). Trochanter with strong ventral process. Femur with pronounced dorsal keel formed by row of tubercles, with ventral row of twelve setiferous tubercles and mesodistal process. Patella with mesal keel without tubercles but with distal process. Shallow slit along tibia mesal surface, separating dorsal and ventral sides.

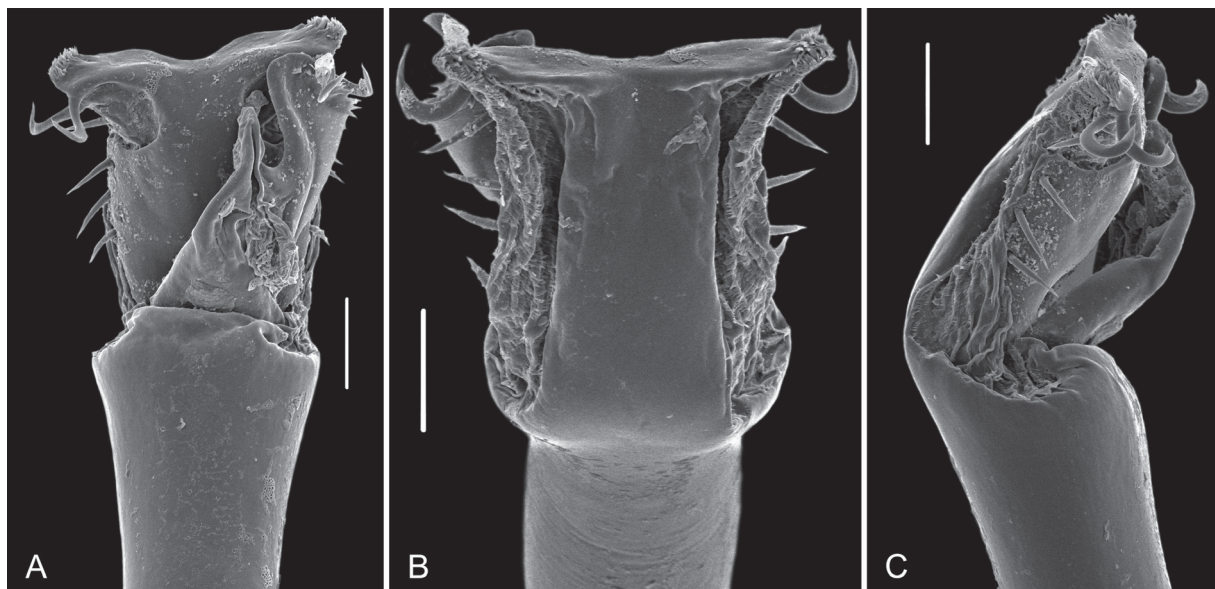
**LEGS** (Figs 16B, 17G–J). Coxa IV granulated, with large clavi inguines, larger in females. Trochanter IV with small retro-distal apophysis. Femur IV substraight, with two longitudinal ventral rows of tubercles increasing in size in distal part. Patella IV substraight, with small setiferous tubercles. Tarsal counts: 6–6/11–10/6–6/7–7.

**COLOR** (Fig. 15). Body and appendages color background 51 (Deep Orange) mottled in 44 (Dark Reddish Brown), ladder mask 104 (Pale Greenish Yellow). Trochanters and tarsomeres 67 (Brilliant Orange Yellow).

**GENITALIA** (Fig. 18). VP of penis subrectangular, narrower basally, with distal border concave; dorsal apophysis of glans subsquare to rounded, wattle of stylus long. Shapes and organization of macrosetae as follows: MS C1–C2 large, curved and flattened; MS D1–D2 large and straight; MS A1–A2 large, straight, cylindrical and located in basal middle of ventral plate; MS B and MS E1–E2 ventral, very small and immersed in microsetae. MS B most basal. Microsetae confined to lateral margins, from corners to base, of VP.

#### Variation

Right tubercle of the posterior margin may be absent in some specimens. Tarsal counts: 6; 10–13; 6–7; 7–8. Variation of measurements is given in Table 2.



**Fig. 18.** *Eulibitia leda* sp. nov., ♂, paratype (ICN-AO 1165.1), distal part of penis. A. Dorsal view. B. Ventral view. C. Lateral view. Scale bars: 50 µm.

**Table 2.** Measurements of body and appendages of *Eulibitia leda* sp. nov.

	ICN-AO 1165 (♂)	MNRJ 9264 (♂)	MNRJ 9264 (♀)	ICN-AO 1165.1 (♂)	ICN-AO 1165.1 (♂)	ICN-AO 1165.1 (♀)	ICN-AO 1165.1 (♀)
CL	2.11	1.96	1.65	1.81	1.54	1.70	1.73
AL	3.29	3.23	3.26	3.30	2.62	3.35	3.30
CW	3.11	2.94	2.76	2.99	2.44	2.88	2.82
AW	5.08	4.89	4.62	4.64	3.89	4.72	4.40
Fe I	2.52	2.75	2.26	2.46	2.36	2.40	2.28
Ti I	1.89	2.00	1.65	1.89	1.61	1.60	1.69
Fe II	4.88	5.44	4.29	4.98	4.38	4.80	4.66
Ti II	3.99	4.22	3.28	3.84	3.59	3.71	3.61
Fe III	3.78	4.06	3.43	3.61	3.36	3.53	3.53
Ti III	2.24	2.50	2.04	2.34	1.97	2.33	2.19
Fe IV	5.19	5.09	4.21	4.87	4.31	4.66	4.41
Ti IV	3.41	3.62	2.81	3.19	2.98	3.11	3.00

**Female**

With larger clavi inguines and longer coda than males. Males with thicker basitarsus (but not notably swollen) (Fig. 16B).

**Distribution**

Only known from type locality, in the WWF ecoregion Magdalena Valley montane forests (NT0136), tropical and subtropical moist broadleaf forest biome, in Santander Department (Fig. 33).

***Eulibitia maculata* Roewer, 1912**

Figs 3, 19–22, 32; Table 3

*Eulibitia maculata* Roewer, 1912: 17, pl. 1, fig 1.

*Libitia (Messa) castanea* Sørensen in Henriksen, 1932: 415. **syn. nov.**

*Eulibitia maculata* – Roewer 1923: 298, fig 320. — Sørensen in Henriksen 1932: 389. — B. Soares 1945: 343. — Weidner 1959: 122. — Pinto-da-Rocha & Hara 2011: 2.

*Paramessa castanea* – Mello-Leitão 1933: 109.

*Messatana castanea* – Strand 1942: 398.

**Diagnosis**

This species differs from the other species of *Eulibitia* by the absence of paramedian tubercles on the posterior margin of the scutum (Fig. 19D–E). The ladder mask can occupy the groove between areas III and IV (Fig. 20A, C–H). This species is similar to *E. helena* sp. nov. and *E. clytemnestra* sp. nov. by the shape of DS, with mid-bulge asymmetrical, but differs from the former by the absence of clavi inguines (Figs 19A, 20A) and by not having larger tubercles on distal femur IV (Fig. 21B–C), and from the latter by the presence of a row of tubercles on the lateral margins of DS (Fig. 20A).

**Etymology**

*Maculata*: Latin adjective, referring to the spots of the scutum. *Castanea*: Latin adjective, referring to the chestnut brown color.



## Type material

### Lectotype (here designated)

COLOMBIA: ♂, Tolima (syntype of *Eulibitia maculata*, SMF RI/471, examined by photograph).

### Paralectotypes

COLOMBIA: 3 ♂♀, Tequendama (syntypes of *Eulibitia maculata*, SMF RI/458, not examined); 1 ♂, Boca del Monte (syntype of *Eulibitia maculata*, SMF RI/469, not examined); 1 ♂, 1 ♀, same collection data as for holotype (syntypes of *Eulibitia maculata*, ZMH coll. Roewer 458, examined by photograph).

### Syntypes

COLOMBIA: 2 ♀♀, Cundinamarca Department, Bogotá (syntypes of *Libitia castanea*, BMNH, examined).

## Other material examined

COLOMBIA: **Boyacá Department** – 1 ♂, Villa de Leyva, SFF Iguaque [5.720016° N, 73.457901° W], 2800 m a.s.l., 22 Sep. 2013, A. García and S. Galvis leg. (ICN-AO 1428); 1 ♀, Chíquiza, Morro Negro, 5°36'36" N, 73°29'20" W, 3245 m a.s.l. (IAvH 15); 1 ♂, same collection data as preceding (IAvH 26). **Cundinamarca Department** – 3 ♂♂, 2 ♀♀, Bogotá, Usme, Páramo de Chisacá, 4°17'1.87" N, 74°12'55.49" W, 3600 m a.s.l., 28 Feb. 1976, I. de Arevalo, R. Restrepo, students leg. (ICN-AO 93); 1 ♂, 1 ♀, Bogotá, Sierras del Chicó, 4°40'16.95" N, 74°2'19.96" W, 15 May 2007, I. Morales leg. (ICN-AO 478); 1 ♂, 4 ♀♀, Bogotá, Usme, Cerro Juan Rey, Olla del Ramo, 4°31'19.68" N, 74°6'17.85" W, 25 Mar. 2003, stubble, pitfall, L. Benavides leg. (ICN-AO 491); 1 ♂, Soacha, Vereda San Francisco, Granja Ecológica El Porvenir, 4°34'30.13" N, 74°17'49.62" W, 2550 m a.s.l., 21 Nov. 2010, bracken, C. Cantor leg. (ICN-AO 784); 2 ♂♂, 1 ♀, Bogotá, Usme, Parque Entrenubes, Cerro Juan Rey, 4°31'17.71" N, 74°5'51.29" W, 2700 m a.s.l., 23–25 May 2003, high scrub, pitfall, L. Benavides leg. (ICN-AO 875); 3 ♂♂, 2 ♀♀, same collection data as preceding (MNRJ 9272); 2 ♂♂, San Antonio del Tequendama, Reserva Natural Los Tunos, 4°33'47.48" N, 74°18'55.69" W, 2300 m a.s.l., 28 May 2012, D. Martínez leg. (ICN-AO 1048); 1 ♂, 2 ♀♀, Guasca, Reserva Biológica El Encenillo, Andean High Forest, 4°47'1.92" N, 73°54'8.76" W, 3050 m a.s.l., 16 Sep. 2012, C. Suárez, A. Herrera, E. Henao, E. Ariza and C. Villalva leg. (ICN-AO 1103); 1 ♀, La Calera, Club La Aguada, Embalse San Rafael, 4°42'25.71" N, 74°0'26.95" W, 2700 m a.s.l., Sep. 2000, D. Tovar and P. Chavarriaga leg. (ICN-AO 493); 3 ♀♀, Sibaté, San Miguel, going to Alto del Cuchuco, 4°26'55.98" N, 74°17'53.87" W, 2630 m a.s.l., 1 Dec. 1980, biology students leg. (ICN-AO 100).

## Description

### Male (based on ICN-AO 93)

MEASUREMENTS. CL = 2.23, AL = 3.91, CW = 3.08, AW = 5.32, Fe IV = 4.58, Ti IV = 4.07.

**DORSUM** (Figs 19, 20A). Dorsal scutum beta-shaped, with asymmetrical mid-bulge, areas I–V unarmed. Lateral margins with irregular row of minute granules at mid-bulge. Posterior margin of scutum with row of small tubercles. Tergites with row of small tubercles and anal operculum finely granular.

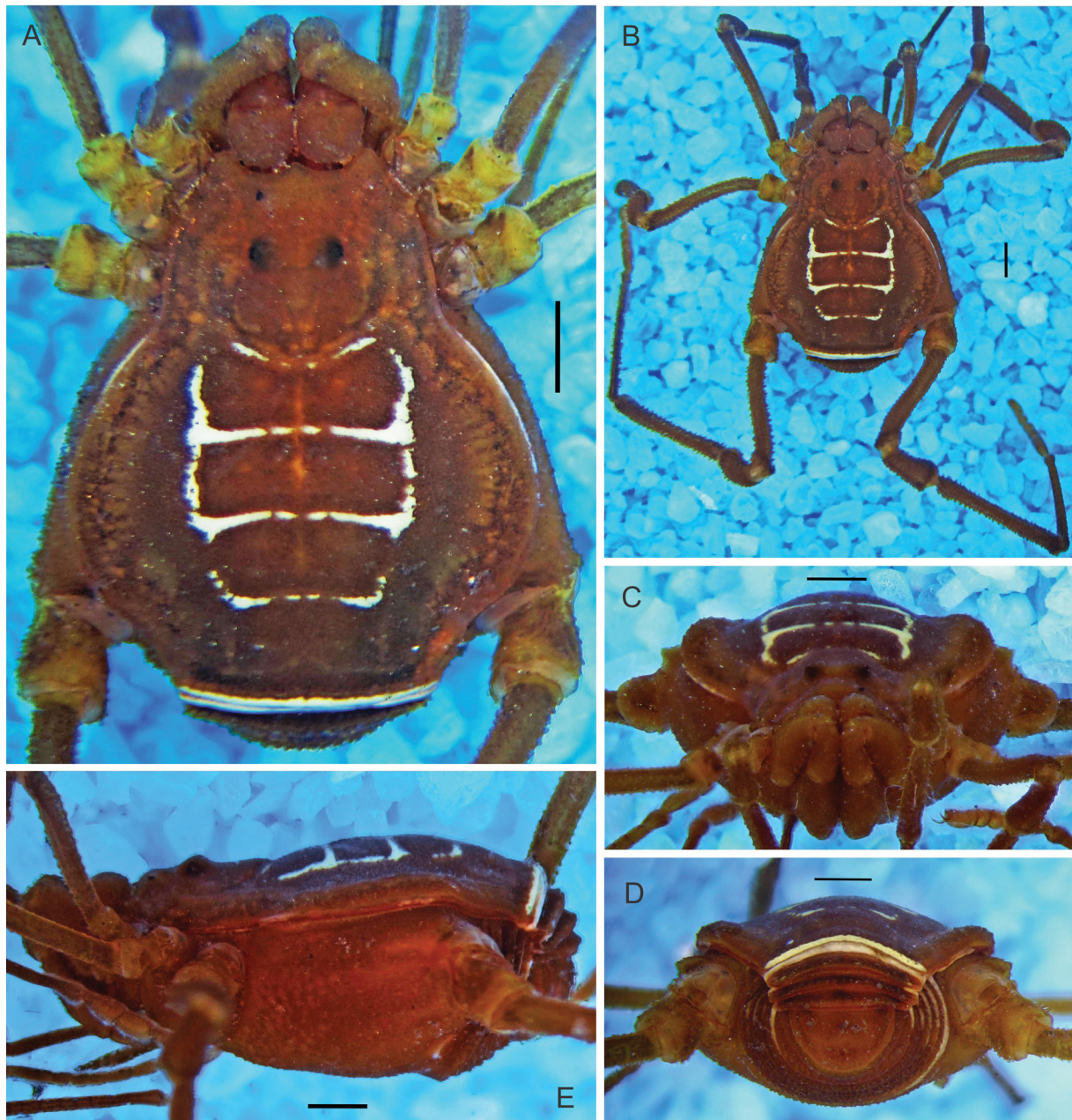
**VENTER** (Fig. 19D–E). Free sternites finely granular; coxae II–IV finely and uniformly granular; coxa I with longitudinal row of tubercles and smooth area corresponding to lace area of pedipalp.

**CHELICERAE** (Fig. 21F). Basichelicerite with ecto-basal row of six tubercles; movable finger serrulate, with basal tubercle larger than others; fixed finger with four tubercles decreasing in size from basal to distal part of finger.

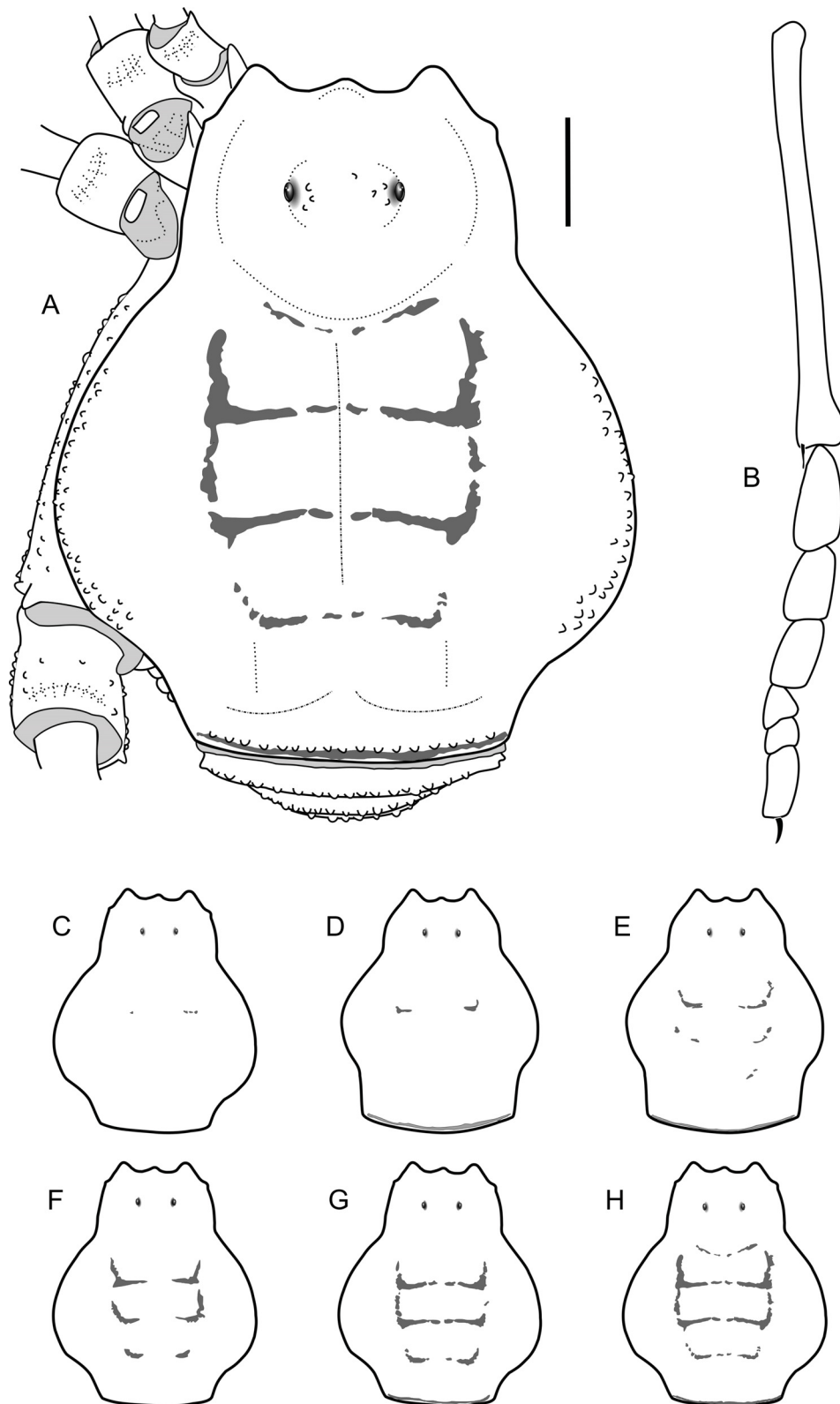
**PEDIPALPS** (Fig. 21D–E). Trochanter with strong ventral process. Femur with pronounced dorsal keel, with ventral row of seven setiferous tubercles and strong mesodistal process. Patella with mesal keel. Shallow slit along tibia mesal surface, separating dorsal and ventral sides.

**LEGS** (Fig. 21A–C). Coxa IV granulated, without clavi inguines. Trochanter IV with small retro-distal apophysis. Femur IV slightly arched, with two longitudinal ventral rows of small tubercles along entire length. Patella IV substraight, with small setiferous tubercles. Tarsal counts: 5–5/9–?/6–6/7–7.

**COLOR** (Fig. 19). Body and appendages color background 41 (Deep Reddish Brown) mottled in 59 (Dark Brown), ladder mask 104 (Pale Greenish Yellow). Trochanters I–III and tarsomeres 99 (Strong Greenish Yellow).



**Fig. 19.** *Eulibitia maculata* Roewer, 1912, ♂ (ICN-AO 93), habitus. **A.** Dorsal view. **B.** Panoramic, dorsal view. **C.** Frontal view. **D.** Posterior view. **E.** Lateral view. Scale bars: 1 mm.



**Fig. 20.** *Eulibitia maculata* Roewer, 1912. **A.** Habitus, dorsal view, ♂ (ICN-AO 93). **B.** Left metatarsus and tarsomeres of leg I, prolateral view (ICN-AO 93). **C–H.** Variation of spot pattern on dorsal scutum. **C.** ♂ (ICN-AO 784). **D.** ♀ (ICN-AO 100). **E.** ♀ (ICN-AO 875). **F.** ♂, holotype (SMF 471). **G–H.** ♂♂ (ICN-AO 93). Scale bars: 1 mm.



**GENITALIA** (Figs 3, 22). Ventral plate of penis subrectangular, narrower basally, with lateral borders subparallel and distal border slightly straight; dorsal apophysis of glans subsquare, wattle of stylus long. Shape and organization of macrosetae as follows: MS C1–C2 large, curved and flat; MS D1 large and slightly curved, D2 straight and half size of D1, both more dorsal than other MS; MS A1–A2 large, straight, cylindrical and located almost in basal middle of ventral plate; MS B and MS E1–E2 ventral, very small and immersed in microsetae. MS B most basal MS. Microsetae confined to lateral margins of ventral plate.



**Fig. 21.** *Eulibitia maculata* Roewer, 1912, ♂ (ICN-AO 875). **A.** Trochanter, femur and patella of leg IV, dorsal view. **B.** Same, prolateral view. **C.** Same, ventral view. **D.** Left pedipalpus, mesal view. **E.** Same, ectal view. **F.** Left chelicera, dorsal view. Scale bars: A–C = 1 mm; D–E = 500 µm; F = 200 µm.

### Variation

Pattern of yellow spots as in Fig. 20C–H. MS A of VP of penis may be variable and asymmetrical in number from two to three, as shown in Figs 3 and 22, corresponding to two specimens from same lot. Tarsal counts: 5–6; 9–10; 6; 6–7. Variation of measurements is given in Table 3.

### Female

Subtly smaller than males, with coda longer (Fig. 20C–D). Males with basitarsus thicker but not notably swollen (Fig. 20B).

### Distribution

*Eulibitia maculata* occurs in the WWF ecoregions: (1) Magdalena Valley montane forests (NT0136), tropical and subtropical moist broadleaf forest biome, and (2) Northern Andean páramo (NT1006),



**Fig. 22.** *Eulibitia maculata* Roewer, 1912, ♂ (ICN-AO 875, different specimen than used in Fig. 2A–B), distal part of penis. **A.** Dorsal view. **B.** Ventral view. **C.** Lateral view. Scale bars: 100 μm.

**Table 3.** Measurements of body and appendages of *Eulibitia maculata* Roewer, 1912.

	ICN-AO 93 (♂)	ICN-AO 93 (♂)	ICN-AO 93 (♀)	ICN-AO 93 (♀)	ICN-AO 784 (♂)	ICN-AO 1103 (♂)	ICN-AO 1103 (♀)	ICN-AO 493 (♀)	ICN-AO 1428 (♂)
CL	2.23	2.28	2.03	1.99	2.33	2.32	2.01	2.04	2.04
AL	3.91	4.01	3.88	3.85	4.42	4.25	4.16	3.77	3.82
CW	3.08	3.22	2.83	2.84	3.34	3.28	2.90	2.93	2.77
AW	5.32	5.50	4.87	4.81	5.36	5.70	4.96	4.92	4.68
Fe I	2.55	2.49	2.26	2.26	3.02	2.80	2.32	2.17	2.67
Ti I	1.81	1.96	1.66	1.54	2.09	2.03	1.85	1.66	1.84
Fe II	4.16	4.39	3.93	3.81	5.55	4.90	4.26	4.01	4.48
Ti II	3.20	3.45	2.84	2.98	4.18	3.95	3.36	3.06	3.28
Fe III	3.72	3.90	3.46	3.36	4.67	4.19	3.57	3.35	3.70
Ti III	2.47	2.52	2.34	3.22	2.89	2.75	2.50	2.22	2.53
Fe IV	4.58	4.64	4.12	4.24	5.37	5.56	4.61	4.17	4.86
Ti IV	4.07	4.07	3.58	3.50	4.46	4.85	4.01	3.62	4.17



montane grassland and shrubland biome; in Tolima, Cundinamarca and Boyacá Departments (Fig. 32). The localities given by Roewer for *Eulibitia maculata* are rather imprecise: Tolima (Roewer 1912) and “Neu Granada” (Roewer 1923; probably referring to Viceroyalty of New Granada, territory corresponding to modern Colombia, Ecuador, Panama, and Venezuela under the jurisdiction of the Spanish Empire until 1819). Tolima Department has an area of 23.562 km<sup>2</sup> and four WWF ecoregions can be distinguished in it; here, a point in NT0136 of the eastern region of the department was chosen to coincide with the other points of occurrence of the species.

### Remarks

Although Roewer (1912) described various characteristics of the specimen ZMH 458, he labeled the lectotype SMF RI/471 as “Type”, which does not entirely match the original description and certainly is a different species. Therefore, the use of ZMH 458 (“ex-typo”, probably belonging to *Ambatoiella*) has masked the identity of the real *Eulibitia* (see for example Pinto-Da-Rocha & Hara 2011, who mentioned characteristics of ZMH 458 in their table 1, although they cited SMF RI/471 as the “holotype” in their text).

The paralectotype ZMH 458 (used for original description) differs from the lectotype (designated here) by: (1) abdominal scutum reaching its maximum width in scutal area II (vs area III in the lectotype); (2) scutal area IV and the posterior margin with two small tubercles; (3) coda long, of same length as the mid-bulge; (4) ectal border of protoglyphs bifurcated, and (5) presence of clavi inguines. The use of those features by Roewer (1928) and Mello-Leitão (1932, 1933) to diagnose the genus, masked the identity of *Eulibitia* and made the detection of synonymies problematic.

The species *Paramessa castanea* was considered a different species from *Eulibitia maculata*, possibly for two reasons: (1) the blot pattern of DS, which is absent in the holotype of *P. castanea*, and the full ladder mask in the lectotype of *E. maculata* (see Figs 20C–H for variation); or (2) the designation of different species in the type series, since Roewer designated ZMH specimens of a species more similar to *Ambatoiella* as paratypes, as explained above.

### *Eulibitia pollux* sp. nov.

[urn:lsid:zoobank.org:act:522C7A02-61AC-45D7-8F84-C42E01F1EC46](http://urn:lsid:zoobank.org:act:522C7A02-61AC-45D7-8F84-C42E01F1EC46)

Figs 23–26, 31B, 34; Table 4

### Diagnosis

This species is similar to *E. castor* sp. nov. in having the paramedian tubercles on the posterior margin of the scutum acuminate, but differs from it because the other areas are unarmed (Figs 23A–B, D–E, 24A). Ladder mask often as paired points in scutal grooves (Fig. 24C); in its full form it covers the scutal groove between areas I and II with a spot with a shape of a mustache (Fig. 24F). Coda short, with symmetrical mid-bulge (Figs 23A, 24A); coxa IV slightly granulated, without clavi inguines (Fig. 24A). Femur IV curved in dorsal view, without conspicuous ornamentation (Fig. 25A–C). This is the only species of *Eulibitia* in which macrosetae D2 are minute, of the same size as MS E and MS B (Fig. 26B).

### Etymology

Noun in apposition from Pollux, son of Leda and Zeus, and twin of Castor. From Greek mythology.

### Material examined

#### Holotype

COLOMBIA: ♂, Boyacá Department, Villa de Leyva, Santuario de Fauna y Flora Iguaque, El Níspero [5°38' N, 73°31' W] (IAvH 35).

### Paratypes

COLOMBIA: 3 ♂♂, 2 ♀♀, 1 immature, Boyacá Department, Villa de Leyva, Santuario de Fauna y Flora Iguaque, 5°42'6.3" N, 73°27'22.4" W, 2941 m a.s.l., 26–27 Nov. 2011, A. García and AB Kury leg. (MNRJ 19369); 1 ♂, 1 ♀, Boyacá Department, Villa de Leyva, SFF Iguaque, 5.7200° N, 73.4579° W, 2800 m a.s.l., 22 Sep. 2013, A. García and S. Galvis leg. (ICN-AO 1379).



**Fig. 23.** *Eulibitia pollux* sp. nov., ♂, paratype (MNRJ 19369), habitus. **A.** Dorsal view. **B.** Left lateral view. **C.** Panoramic, dorsal view. **D.** Frontal view. **E.** Posterior view. **F.** Detail of another paratype with a single spine on posterior margin of scutum. Scale bars: 1 mm.



**Other material**

COLOMBIA: **Boyacá Department** – 1 ♂, Villa de Leyva, SFF Iguaque, sector Carrizal, 5°41'52.28" N, 73°27'11.28" W, 9 Jun. 2001, E. Flórez leg. (ICN-AO 295); 2 ♀♀, Villa de Leyva, SFF Iguaque 5.720016° N, 73.457901° W, 2800 m a.s.l., 22 Sep. 2013, A. García and S. Galvis leg. (ICN-AO 1427); 2 ♀♀, Villa de Leyva, Santuario de Fauna y Flora Iguaque, El Níspero [5°38' N, 73°31' W] (IAvH 33, IAvH 34); 1 ♀, Santuario de Fauna y Flora Iguaque, Cabaña Carrizal [5°42' N, 73°27' W], 2850 m a.s.l. (IAvH 16); 1 ♂, Villa de Leyva, 5.720016° N, 73.457901° W, 2900 m a.s.l. (IAvH 18); 6 ♀♀, San Pedro de Iguaque [Chiquiza], Morro Negro [5°36'36" N, 73°29'20" W], 3220 m a.s.l. (IAvH 14, IAvH 19, IAvH 20, IAvH 21, IAvH 22, IAvH 30); 2 ♂♂, same collection data as preceding (IAvH 27, IAvH 66); 1 ♂, same locality as preceding, 3220 m a.s.l., 14–16 May 2003, E. González and C. Reina leg. (IAvH 81); 2 ♂♂, Santuario de Fauna y Flora Iguaque, Cabaña Carrizal [5°42' N, 73°27' W], 2850 m a.s.l. (IAvH 23, IAvH 24); 1 ♂, Villa de Leyva, Laguna Iguaque [5.642778° N, 73.564722° W], 2800 m a.s.l. (IAvH 28); 1 ♀, Santuario de Fauna y Flora Iguaque, Quebrada Los Francos [5.700° N, 73.450° W], 2860 m a.s.l. (IAvH 31); 1 ♂, Villa de Leyva, SFF Iguaque, 5.7200° N, 73.4579° W, 2750 m a.s.l., Mar. 1993 (ICN-AO 474). **Cundinamarca Department** – 4 ♂♂, 3 ♀♀, Bogotá, Usme, Parque Entrenubes, Cerro Juan Rey, 4°31'17.71" N, 74°5'51.29" W, 2700 m a.s.l., 23–25 May 2003, high scrub, pitfall, L. Benavides leg. (ICN-AO 422); 1 ♀, Parque Nacional Natural Chingaza, Vereda San Francisco, Reserva Forestal Río Blanco, Palacio [4.722° N, 73.828° W], 2970 m a.s.l. (IAvH 37); 1 ♂, Parque Nacional Natural Chingaza, Alto de La Bandera [4.5167° N, 73.750° W], 3660 m a.s.l. (IAvH 65). – **SANTANDER DEPARTMENT**: 1 ♂, Encino, Santuario de Fauna y Flora Guanentá, Vega del Diablo, Río Negro [5.950° N, 73.183° W], 1900 m a.s.l. (IAvH 95); 2 ♀♀, same collection data as preceding (IAvH 96, IAvH 97). **Valle del Cauca Department** – 1 ♂, Palmira [3.531° N, 76.260° W, 1040 m a.s.l.], 22 May 1998, J. Herrera leg. (ICN-AO 1105).

**Description****Male** (based on holotype)

MEASUREMENTS. CL = 1.86, AL = 3.30, CW = 2.80, AW = 4.20, Fe IV = 4.27, Ti IV = 3.45.

**DORSUM** (Figs 23, 24A). Dorsal scutum beta-shaped, with symmetrical mid-bulge. Posterior margin of scutum with two contiguous acuminate paramedian tubercles. Lateral margins of scutum granulated. Posterior margin of scutum with a row of small tubercles. Tergites with row of small tubercles and anal operculum finely granular.

**VENTER** (Fig. 23B, E). Free sternites finely granular; coxae II–IV finely and uniformly granular; coxa I with longitudinal row of tubercles and smooth area matching interlocking Tr of pedipalpus.

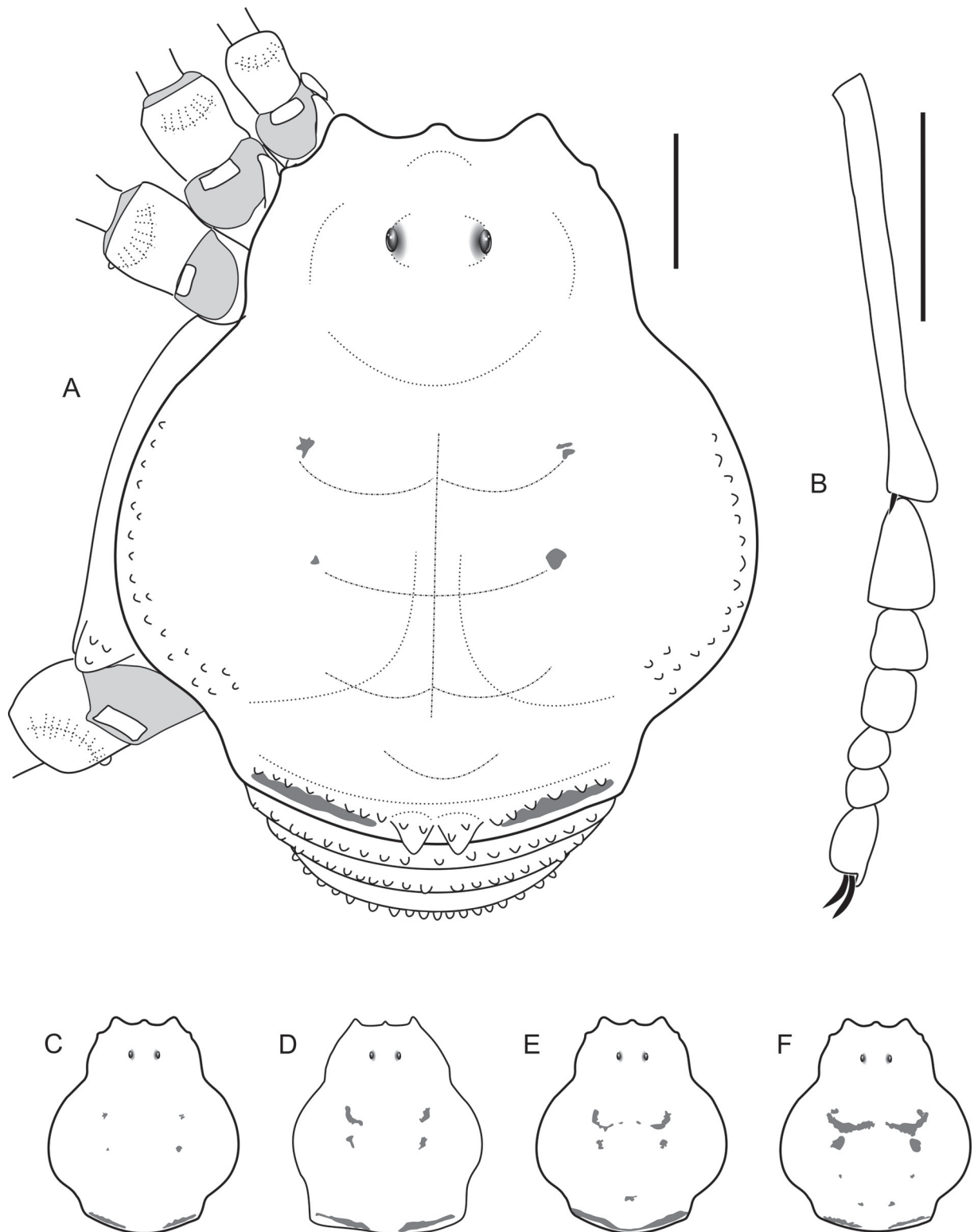
**CHELICERAE** (Fig. 25F). Basichelicerite with row of seven small tubercles on basal side and some disperse tubercles on dorsal side; movable finger with row of eleven tubercles, giving a serrated appearance; fixed finger with five tubercles, decreasing in size from basal to distal part of finger.

**PEDIPALPS** (Fig. 25D, E). Trochanter with strong ventral process. Femur with pronounced dorsal row of seven separated tubercles, with ventral row of seven setiferous tubercles and mesodistal process. Patella with low mesal keel.

**LEGS** (Figs 24B, 25A–C). Coxa IV finely granulated, without clavi inguines, distal apophysis of coxa IV tuberculate and directed laterally. Trochanter IV with small retro-distal apophysis. Femur IV curved in dorsal view, with two longitudinal ventral rows of small tubercles along entire length. Patella IV substraight, with small tubercles. Tarsal counts: 6–6(3)/10–10(3)/6–6/7–7.

**COLOR** (Fig. 23). Body and appendages color background 40 (Strong Reddish Brown) mottled in 44 (Dark Reddish Brown), ladder mask 104 (Pale Greenish Yellow). Pedipalpus, chelicerae, and trochanters and tarsomeres of legs 83 (Brilliant Yellow).





**Fig. 24.** *Eulibitia pollux* sp. nov., ♂, paratype (MNRJ 19369). **A.** Habitus, dorsal view. **B.** Left metatarsus and tarsomeres of leg I, prolateral view. **C–F.** Variation of spot pattern on dorsal scutum. **C.** ♂ (MNRJ 19369). **D.** ♀ (ICN-AO 422). **E.** ♂ (ICN-AO 422). **F.** ♂ (IAvH 97). Scale bars: 1 mm.

GENITALIA (Fig. 26). Ventral plate subrectangular, narrower basally and distal border hardly concave; dorsal apophysis of glans long and narrow, wattle long. Shapes and organization of macrosetae as follows: MS C1–C2 large, curved and flat; MS D1 large and straight, D2 minute; MS A1–A2 large,



**Fig. 25.** *Eulibitia pollux* sp. nov., ♂ (ICN-AO 422). **A.** Trochanter, femur and patella of leg IV, dorsal view. **B.** Same, prolateral view. **C.** Same, ventral view. **D.** Left pedipalpus, ectal view. **E.** Same, mesal view. **F.** Left chelicera, dorsal view. Scale bars: A–C = 1 mm; D–E = 500 µm; F = 200 µm.

**Table 4.** Measurements of body and appendages of *Eulibitia pollux* sp. nov.

	MNRJ 19369 (♀)	MNRJ 19369 (♂)	IAvH 35 (♂)	MNRJ 19369 (♂)	MNRJ 19369 (♂)	MNRJ 19369 (♀)	ICN-AO 1379 (♂)	ICN-AO 1379 (♀)	ICN-AO 1105 (♂)
CL	1.97	1.73	1.86	2.06	1.90	1.77	1.89	1.83	1.85
AL	3.81	3.23	3.30	3.48	3.33	3.29	3.30	3.56	3.32
CW	2.95	2.69	2.80	2.96	2.74	2.74	2.89	2.89	2.75
AW	4.70	4.22	4.20	4.86	4.28	4.36	4.53	4.44	4.29
Fe I	2.34	2.29	2.34	2.50	2.38	2.25	2.30	2.33	2.13
Ti I	1.81	1.68	1.78	1.79	1.72	1.58	1.65	1.69	1.60
Fe II	4.09	4.05	4.36	4.69	4.41	4.08	4.11	4.49	4.04
Ti II	3.39	2.99	3.36	3.51	3.36	3.07	3.30	3.19	3.12
Fe III	3.25	3.22	3.27	3.65	3.43	3.15	3.42	3.33	3.20
Ti III	2.25	2.08	2.29	2.32	2.29	2.03	2.28	2.18	2.13
Fe IV	4.03	3.99	4.27	4.52	4.20	3.85	4.16	4.04	3.84
Ti IV	3.29	3.16	3.45	3.64	3.19	2.98	3.80	3.05	3.20



cylindrical, straight and located in middle of ventral plate; MS B and MS E1–E2 ventral, very small, immersed in microsetae. Pair of MS B at base of ventral plate.

#### Variation

Right tubercle of posterior margin absent in some specimens (Fig. 23F). Variation of spots in DS as shown in Fig. 24C–F. Tarsal counts: 5–6; 8–11; 6; 6–7. Variation of measurements is given in Table 4.

#### Female

Coda larger than in males (Fig. 24C–D). Basitarsomeres in legs I thickened but not swollen (Fig. 24B).

#### Distribution

*E. pollux* sp. nov. occurs in the WWF ecoregions: (1) Magdalena Valley montane forests (NT0136), tropical and subtropical moist broadleaf forest biome; (2) northern Andean páramo (NT1006), montane grassland and shrubland biome, and (3) Cauca Valley montane forests (NT0109), tropical and subtropical moist broadleaf forest biome (Fig. 34).

#### *Eulibitia scalaris* (Sørensen, 1932) comb. nov.

Figs 27–30, 31A, 33; Table 5

*Libitia* (*Messa*) *scalaris* Sørensen in Henriksen, 1932: 414.

*Acromares lateralis* Goodnight & Goodnight, 1943: 2, fig 7. **syn. nov.**

*Messa scalaris* – Mello-Leitão 1933: 112.

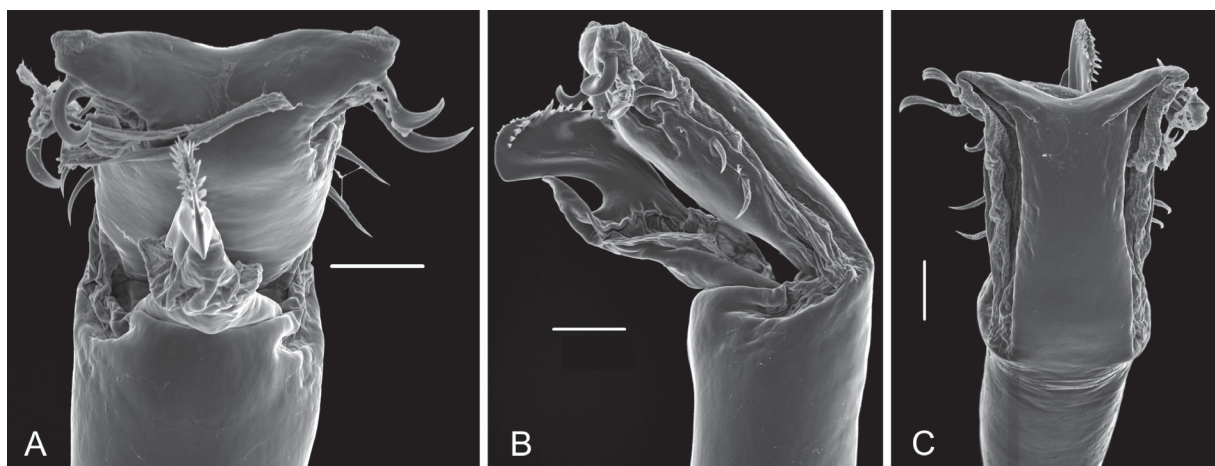
*Messatana scalaris* – Strand 1942: 398.

*Cynorta lateralis* – Goodnight & Goodnight 1953: 38.

*Acromares lateralis* – Flórez & Sánchez 1995: 368. — Kury 2003: 37.

#### Diagnosis

This species is similar to *E. h-inscriptum* by having paramedian tubercles in areas I, III and on the posterior margin of the scutum, but differs from it because its ladder mask does not reach the lateral margins of the scutum (Fig. 28C–H), and from the other species of *Eulibitia* by the size of the coda (Fig. 27A),  $\frac{1}{3}$  of the mid-bulge length (vs  $\frac{1}{4}$  of the mid-bulge length in other species, except *E. h-inscriptum*). It is similar to *E. castor* sp. nov. by having two paramedian tubercles in areas I, III



**Fig. 26.** *Eulibitia pollux* sp. nov., ♂ (MNRJ 19369), distal part of penis. **A.** Dorsal view. **B.** Lateral view. **C.** Ventral view. Scale bars: 50  $\mu$ m.

and on the posterior margin, and for the symmetrical mid-bulge, but it differs from it by the shape of the tubercles on the posterior margin, being rounded instead of acuminate (Fig. 28A).

### Etymology

*Scalaris*: refers to the shape of the ladder of white blots on DS. *Lateralis*: refers to the rails of the ladder mask on DS (visible in the holotype of *Acromares lateralis*).

### Material examined

#### Syntypes

COLOMBIA: 2 ♂♂, 2 ♀♀, Cundinamarca Department, Bogotá (BMNH, examined by photograph).

#### Other material

COLOMBIA: **Boyacá Department** – 1 ♀, Chiquinquirá, Monte Batallón Sucre, 5°35'59.33" N, 73°50'9.28" W, 2580 m a.s.l., 24 May 1979, C. Hernandez leg. (ICN-AO 56); 4 ♂♂, 7 ♀♀, Paipa, La Pradera, 5°45'36.26" N, 73°8'29.37" W, 2650 m a.s.l., 2 Dec. 1978, I. de Arevalo leg. (ICN-AO 84); 2 ♀♀, Arcabuco, 5°45'0" N, 73°28'45" W, 2500 m a.s.l., S. Sierra leg. (ICN-AO 221); 1 ♂, Arcabuco, 5.75012° N, 73.433482° W, 2600 m a.s.l., 23 Sep. 2013, A. García and S. Galvis leg. (ICN-AO 1202); 34 ♂♂, 49 ♀♀, Arcabuco, 5.75012° N, 73.433482° W, 2600 m a.s.l., 23 Sep. 2013, A. García and S. Galvis leg. (ICN-AO 1208); 7 ♂♂, 6 ♀♀, Villa de Leyva, SFF Iguaque, 5.720016° N, 73.457901° W, 2800 m a.s.l., 22 Sep. 2013, A. García and S. Galvis leg. (ICN-AO 1214); 2 ♂♂, 3 ♀♀, Arcabuco, 5.75012° N, 73.433482° W, 2600 m a.s.l., 23 Sep. 2013, A. García and S. Galvis leg. (ICN-AO 1372); 2 ♂♂, 2 ♀♀, Arcabuco, 5.75012° N, 73.433482° W, 2600 m a.s.l., 23 Sep. 2013, A. García and S. Galvis leg. (ICN-AO 1378); 2 ♀♀, Villa de Leyva, SFF Iguaque, Cabaña Chaina, Lado Río, 5°42' N, 73°27' W, 2600 m a.s.l. (IAvH 40, IAvH 42); 1 ♂, same collection data as preceding (IAvH 41); 1 ♀, Villa de Leyva, Colegio Antonio Nariño, 5.63° N, 73.527° W, 2200 m a.s.l. (IAvH 46); 1 ♀, Arcabuco, near El Cometa, 5.7439° N, 73.4713° W (IAvH 53); 1 ♀, Villa de Leyva, Colegio Antonio Nariño, 5.63° N, 73.527° W, 2200 m a.s.l. (IAvH 93); 1 ♂, Villade Leyva, Colegio Antonio Nariño, 5.63° N, 73.527° W, 2200 m a.s.l. (IAvH 94); 1 ♂, 4 ♀♀, Villa de Leyva, SFF Iguaque, 5°42' N, 73°27' W, 2941 m a.s.l., Nov. 2011, A. García and AB Kury leg. (MNRJ 19380). **Cundinamarca Department** – 1 ♂, Susa, Vereda La Fragua, Finca Bermejales, 5°25'37.90" N, 73°49'11.81" W, 2710 m a.s.l., 30 Dec. 2006, J. Pinzon and G. Alarcón leg. (ICN-AO 481); 2 ♀♀, Soacha, Vereda San Francisco, Granja Ecológica El Porvenir, 4°34'30.13" N, 74°17'49.62" W, 10 Jul. 2009, pastureland, fallen trunk, G. Amat, C. Cantor, I. Romero and D. Martínez leg. (ICN-AO 602); 2 ♂♂, Suesca, Vereda Santa Rosa, 5°6'20.71" N, 73°45'9.02" W, 30 Mar. 2010, paddock, under trunk, L. Sanchez leg. (ICN-AO 669); 2 ♂♂, San Antonio del Tequendama, Vereda Quinta Colombia, 4°35.603" N, 74°20.170" W, 1733 m a.s.l., 20 Aug. 2008, R. Botero, D. Luna and J. A. Ochoa leg. (ICN-AO 792); 1 ♂, San Francisco, near Pueblo, 4°57'37.40" N, 74°16'45.08" W, 8 May 2011, D. Martínez, M. Medrano and A. García leg. (ICN-AO 846); 2 ♂♂, 2 ♀♀, Albán, Vereda Namay 4°55'31.38" N, 74°27'12.47" W, 28 Jun. 2008, J. Cepeda leg. (ICN-AO 504); 11 ♂♂, 11 ♀♀, 4 immature, Cota [4.813113° N, 74.110399° W], 30 Aug. 2006, A. Giupponi leg. (MNRJ 17948); 1 ♂, Mosquera, Sabrinsky [4.688968° N, 74.271632° W], 10 Jan. 2014, under rocks, J. Guerrero leg. (ICN-AO 1404); 4 ♂♂, 6 ♀♀, Albán, Vereda Namay, 4°55'31.38" N, 74°27'12.47" W, 1584 m a.s.l., Oct. 2007–Aug. 2008, Cafetal, J. Cepeda, C. Cantor and D. Luna leg. (ICN-AO 935); 1 ♂, 1 ♀, Cota Sendero, Cerro del Majuy, 4°48'42.16" N, 74°6'59.14" W, 3000 m a.s.l., 24 Jun. 2012, under rock, C. Castellanos and Y. Cifuentes leg. (ICN-AO 1058); 2 ♂♂, 2 ♀♀, Albán, Vereda Namay, 4°55'31.38" N, 74°27'12.47" W, 28 Jun. 2008, J. Cepeda leg. (ICN-AO 504); 1 ♂, 1 ♀, Albán, Reserva Natural Peñas del Aserradero, 4.875959° N, 74.422635° W, 2630 m a.s.l., Aug. 2013, under trunk, M. Medrano, E. Flórez, A. Sabogal and D. Martínez leg. (ICN-AO 1387); 2 ♀♀, 1 immature, Chocontá, Vereda Boquerón Bajo, Finca Nápoles, 5.094417° N, 73.670240° W, 13 Feb 2015, A. García and T. Rodríguez leg. (ICN-AO 1434).

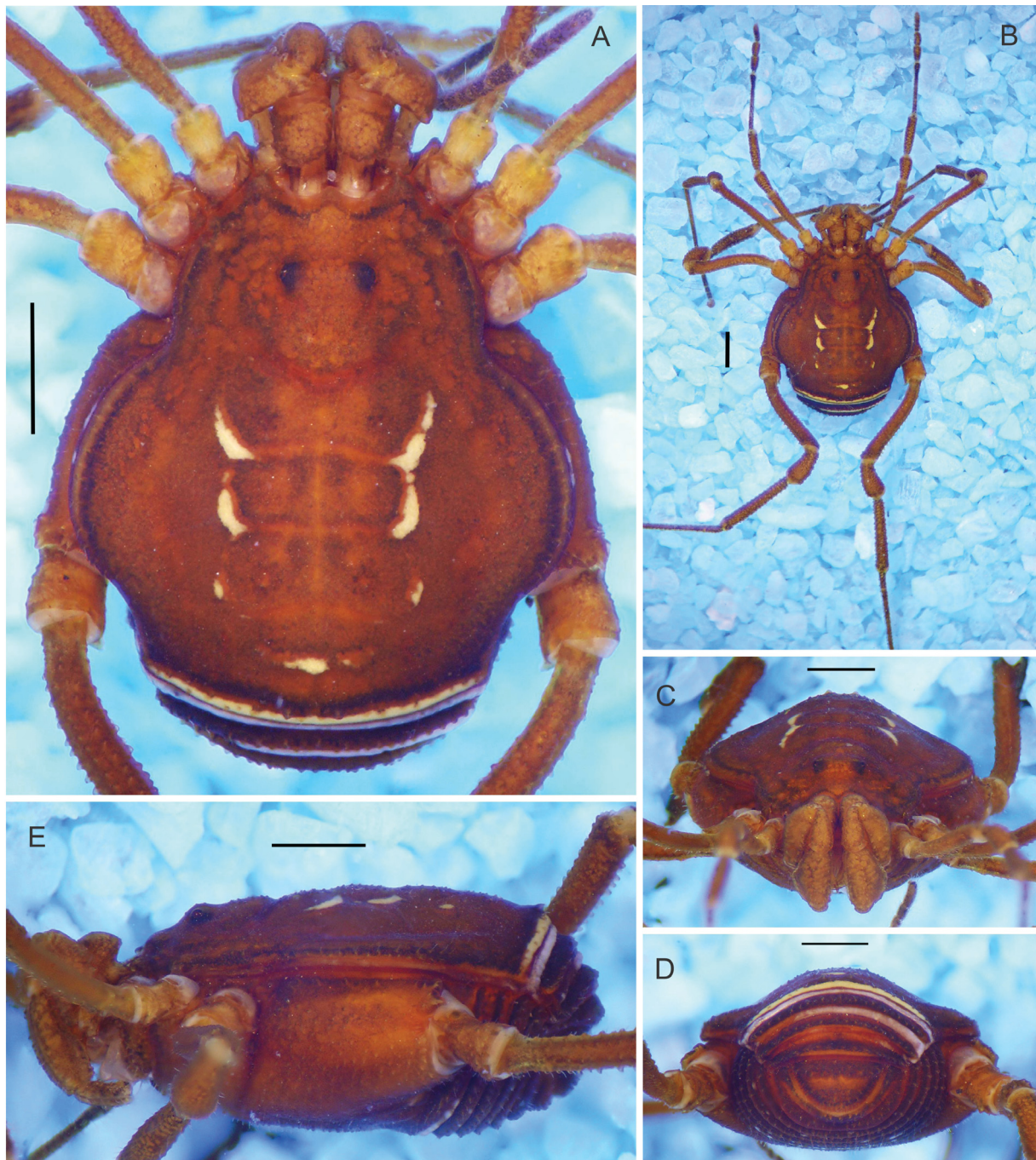


## Description

**Male** (based on MNRJ 17948)

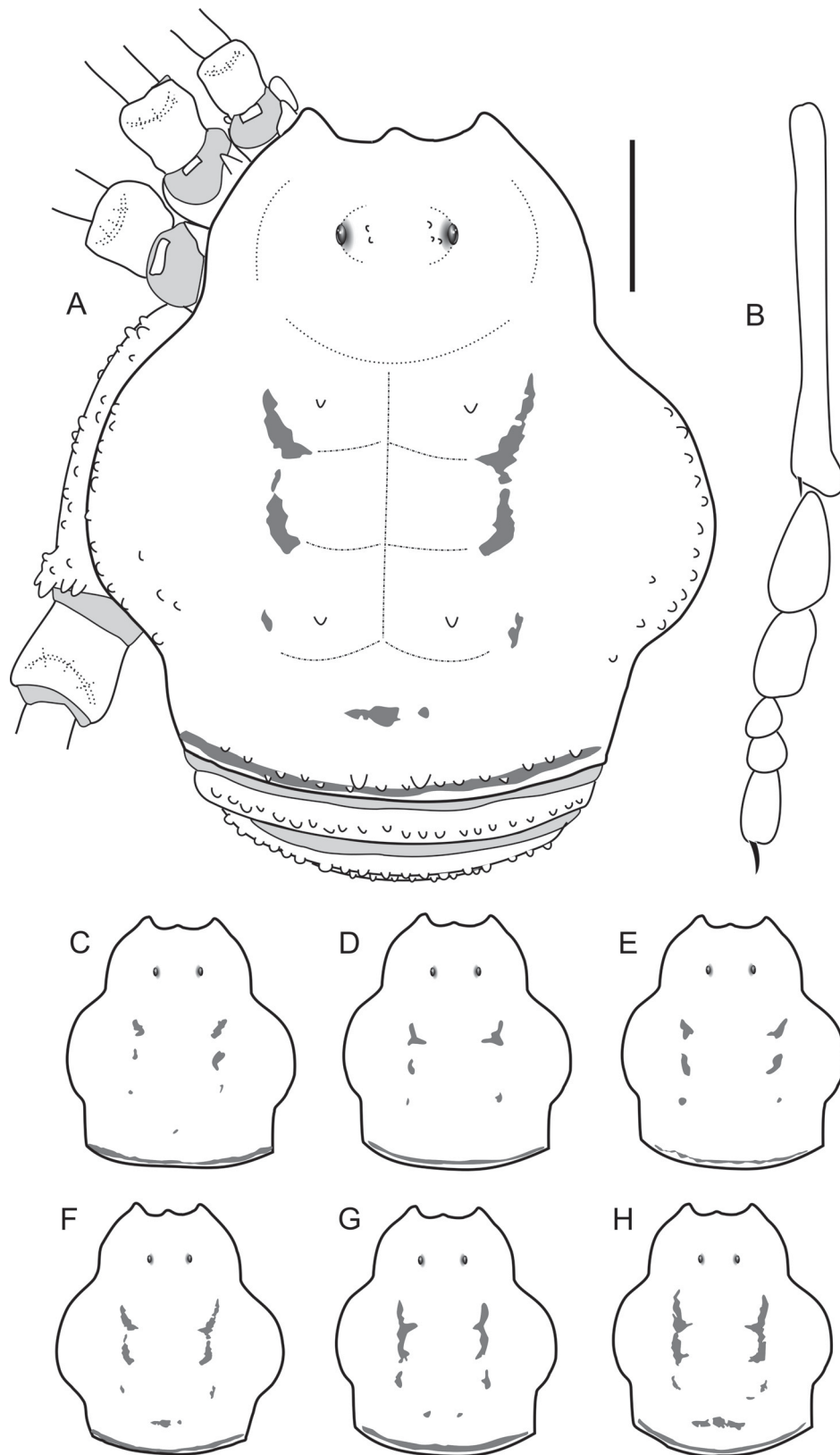
MEASUREMENTS. CL = 1.62, AL = 3.06, CW = 2.63, AW = 4.31, Fe IV = 2.94, Ti IV = 2.38.

DORSUM (Figs 27, 28A). Dorsal scutum beta-shaped, with symmetrical mid-bulge. Areas I, III and posterior margin with two paramedian tubercles. Lateral margins with irregular row of minute granules at



**Fig. 27.** *Eulibitia scalaris* (Sørensen in Henriksen, 1932) comb. nov., ♂ (MNRJ 17948), habitus. A. Dorsal view. B. Panoramic, dorsal view. C. Frontal view. D. Posterior view. E. Lateral view. Scale bars: 1 mm.





**Fig. 28.** *Eulibitia scalaris* (Sørensen in Henriksen, 1932) comb. nov. (MNRJ 17948). **A.** ♂, habitus, dorsal view. **B.** Left metatarsus and tarsomeres of leg I, prolateral view. **C–F.** Variation of spot pattern on dorsal scutum. **C–E, G–H:** ♀♀. **F:** ♂. Scale bars: 1 mm.

mid-bulge. Posterior margin of scutum with row of small tubercles. Tergites with row of small tubercles and anal operculum finely granular.

VENTER (Fig. 27D–E). Free sternites finely granular; coxae II–IV finely and uniformly granular; coxa I with longitudinal row of tubercles and smooth area corresponding to lace area of pedipalp.



**Fig. 29.** *Eulibitia scalaris* (Sørensen in Henriksen, 1932) comb. nov., ♂ (ICN-AO 1208). **A.** Trochanter and femur of leg IV, dorsal view. **B.** Same, prolateral view. **C.** Same, ventral view. **D.** Left pedipalpus, ectal view. **E.** Same, mesal view. **F.** Fingers of the hand of left chelicera, dorsal view. **G.** Left chelicera, dorsal view. Scale bars: A–C = 1 mm; D–E = 500 µm; F–G = 200 µm.



**CHELICERAE** (Fig. 29F–G). Basichelicerite uniformly covered with tubercles of different sizes, some basal and one mesodistal larger; movable finger with row of ten tubercles; fixed finger with four tubercles, decreasing in size from basal to distal part of finger.

**PEDIPALPS** (Fig. 29D–E). Trochanter with strong ventral apophysis. Femur with pronounced dorsal keel, with ventral row of eight setiferous tubercles and mesodistal process. Patella with mesal keel formed by five small tubercles and large one distally. Shallow slit along tibia mesal surface, separating dorsal and ventral sides.

**LEGS** (Figs 28B, 29A–C). Coxa IV granulated, with small clavi inguines, larger in females. Trochanter IV with small retro-distal apophysis. Femur IV substraight, with two longitudinal ventral rows of small



**Fig. 30.** *Eulibitia scalaris* (Sørensen in Henriksen, 1932) comb. nov., ♂ (ICN-AO 1208), distal part of penis. **A.** Lateral view. **B.** Dorsal view. **C.** Ventral view. **D.** Detail of MS C, MS D1, MS E1 and microsetae, ventral view. Scale bars: A, C = 50 µm; B = 20 µm; D = 10 µm.



**Table 5.** Measurements of body and appendages of *Eulibinia scalaris* (Sørensen in Henriksen, 1932) comb. nov.

	ICN-AO 792 (♂)	ICN-AO 792 (♂)	ICN-AO 1414 (♂)	ICN-AO 602 (♀)	ICN-AO 602 (♀)	MNRJ 19380 (♂)	MNRJ 19380 (♀)	MNRJ 17948 (♂)	MNRJ 17948 (♀)
CL	1.65	1.85	1.57	1.49	1.42	1.52	1.53	1.62	1.60
AL	2.70	3.13	2.68	2.71	3.02	2.65	2.59	3.06	3.07
CW	2.53	2.77	2.46	2.47	2.43	2.38	2.36	2.63	2.58
AW	3.97	4.80	3.75	3.70	4.03	3.68	3.73	4.31	4.22
Fe I	2.05	2.29	1.63	1.58	1.63	1.67	1.51	1.70	1.61
Ti I	1.42	1.62	1.26	1.11	1.14	1.27	1.08	1.23	1.15
Fe II	4.05	4.31	2.95	2.57	2.84	3.23	2.70	3.21	2.88
Ti II	3.13	3.61	2.21	1.93	2.08	2.24	1.96	2.22	2.00
Fe III	3.12	3.37	2.51	2.29	2.36	2.59	2.40	2.52	2.35
Ti III	1.85	2.31	1.64	1.49	1.57	1.65	1.44	1.80	1.50
Fe IV	3.78	4.34	3.09	2.57	2.83	3.26	2.64	2.94	2.96
Ti IV	2.62	3.17	2.33	1.93	2.15	2.44	2.17	2.38	2.23

tubercles along entire length. Patella IV substraight, with small setiferous tubercles. Tarsal counts: 5–5/10–10/6–6/6–7.

**COLOR** (Fig. 27). Body and appendages color background 40 (Strong Reddish Brown) mottled in 44 (Dark Reddish Brown), ladder mask 104 (Pale Greenish Yellow). Trochanters and tarsomeres 83 (Brilliant Yellow).

**GENITALIA** (Fig. 30). VP of penis trapezoidal, narrower basally, with distal border concave; dorsal apophysis of glans subsquare to rounded, wattle of stylus long. Shapes and organization of macrosetae as follows: MS C1–C2 large, curved and flat; MS D1–D2 large and straight; MS A1–A2 large, straight, cylindrical, located in basal middle of ventral plate; MS B and MS E1–E2 ventral, very small, immersed in microsetae. MS B most basal MS. Microsetae confined to lateral margins of ventral plate.

### Variation

Pattern of yellow spots as in Fig. 28C–H. Tubercles of pedipalpal femur vary in number from 5 to 8. Tarsal counts: 5–6; 7–12; 6–7; 6–7. Variation of measurements is given in Table 5.

### Female

With larger clavi inguines and longer coda than males (Fig. 28F–G). Males with thicker basitarsus (but not notably swollen) (Fig. 28B).

### Distribution

*E. scalaris* occurs in the WWF ecoregions: (1) Magdalena Valley montane forests (NT0136), tropical and subtropical moist broadleaf forest biome, in Cundinamarca and Boyacá Departments, (2) Magdalena Valley dry forests (NT0221), tropical and subtropical dry broadleaf forest biome, in Tolima Department, and (3) Northern Andean páramo (NT1006), montane grassland and shrubland biome, in Cundinamarca and Boyacá Departments (Fig. 33).



**Fig. 31.** Living specimens. **A.** *Eulibitia scalaris* (Sørensen in Henriksen, 1932) comb. nov. (ICN-AO 1208), photograph by Andrés García, Arcabuco, Boyacá Department. **B.** *Eulibitia pollux* sp. nov., photograph by M. Medrano, Choachi, Cundinamarca Department.

### Remarks

Goodnight & Goodnight (1943) described *Acromares lateralis* and placed it in that genus because they thought that the outstanding tubercles of the dorsal scutum were localized in area IV. However, examination of a photograph of the type material allows us to conclude that the tubercles are on the posterior margin of the scutum instead of on area IV and to recognize this species as a synonym of *E. scalaris* comb. nov.

### *Ambatoiella* Mello-Leitão, 1943

*Ambatoiella* Mello-Leitão, 1943: 8; Kury 2003: 37 (junior subjective synonym of *Vonones* Simon, 1879 according to Goodnight & Goodnight (1953: 60); synonymy disclaimed by Kury (2003); type species: *Ambatoiella vigilans* Mello-Leitão, 1943, by original designation).

### *Ambatoiella sexpunctata* (Roewer, 1914) comb. nov.

*Eulibitia sexpunctata* Roewer, 1914: 127, pl. 13, fig 4.

*Eulibitia sexpunctata* – Roewer 1923: 299, fig. 321.

### Type material

#### Holotype

ECUADOR: ♂, Guayas, Guayaquil (MNHN, examined).

#### Paratype

ECUADOR: 1 ♂, Riobamba (SMF RI/473 - 32, examined by photograph).

### Remarks

This species is morphologically similar to *Ambatoiella vigilans* Mello-Leitão, 1943 by: (1) coxa IV only apically visible in dorsal view, and (2) coda large, about one third the length of DS. Likewise, the type localities of the two species are only 50 km apart from each other and are in the same mountain range. There is a strong possibility that they are male and female of the same species; however, we decided to maintain them as separate species until further analyses have been carried out.

### *Cosmetinae incertae sedis*

### *Eulibitia annulipes* Roewer, 1912

*Eulibitia annulipes* Roewer, 1912: 18.

*Eulibitia annulipes* – Roewer 1923: 298.

### Type material

#### Holotype

COLOMBIA: ♂, Tolima [according to label; incorrectly reported in the original description as “Ecuador (Guayaquil)”] (SMF RI/447 - 32, examined by photograph).

### Remarks

The size of the body, shape of the outline of DS and the strong and uniform granularity of the scutum do not correspond to the genus *Eulibitia*. It was impossible to fit this species in any known genus; the most similar genus is *Ambatoiella* based on the alpha-shaped scutum, but an analysis of the type material or topotypes is needed to allow an accurate decision.

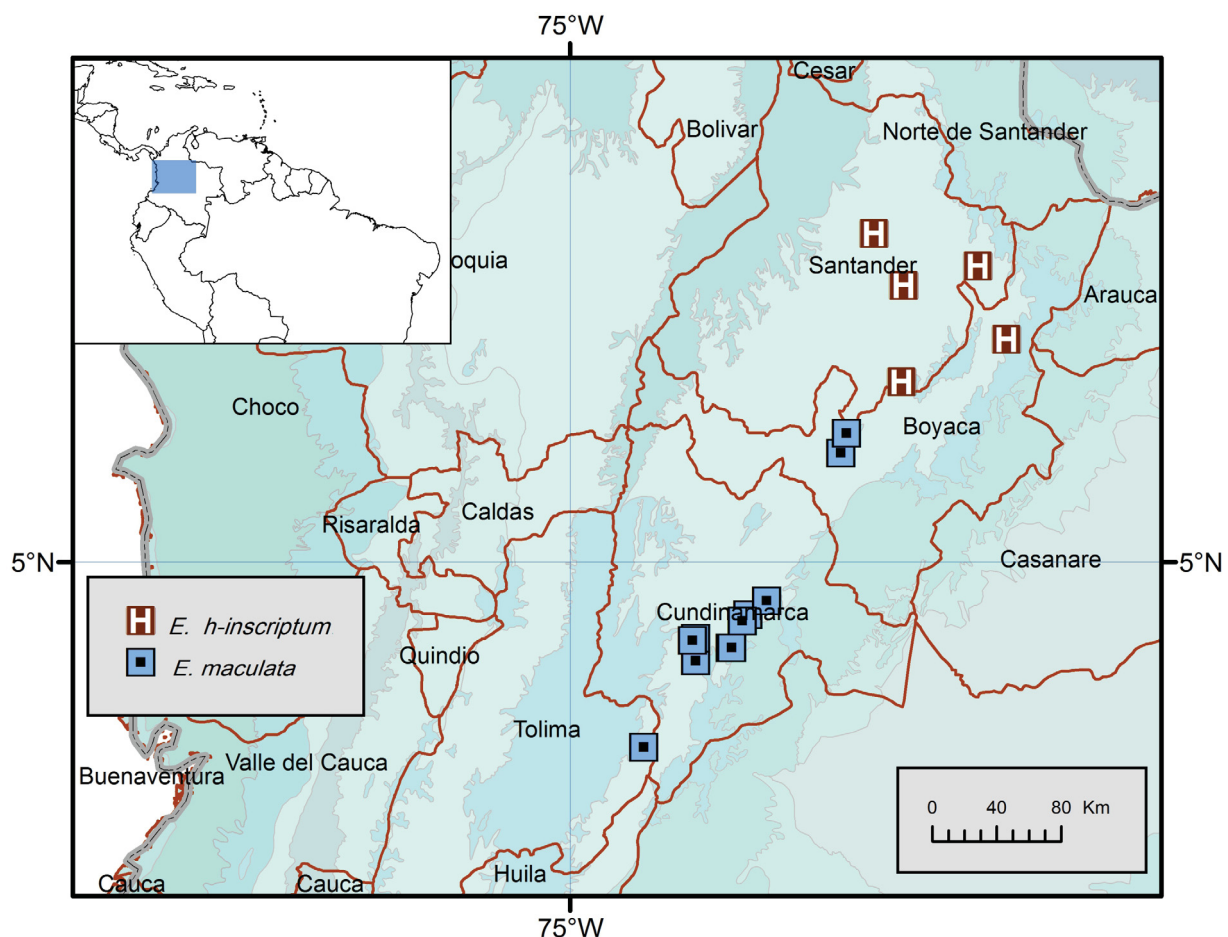


## Discussion

### Morphology

*Eulibitia* seems to be a good example of the conservative external morphology of Cosmetidae mentioned above in the Introduction; the variations in shape of outline of DS and the morphology of pedipalpus, legs and chelicera are extremely subtle, and the delimitation of species may be difficult. Nonetheless, some characteristics have proved useful to differentiate species of *Eulibitia*, such as: (1) the armature of the scutal areas, commonly useless for diagnosing genera; (2) the armature of femur IV; and (3) the occurrence of clavi inguines.

The morphology of the reproductive organs in Gonyleptoidea has been shown to be very valuable in phylogenetic analyses (i.e., Kury & Villarreal 2015; Cruz-López & Francke 2015), and has been well explored in detail for some species (i.e., Bennett & Townsend 2013; Walker & Townsend 2014; Townsend *et al.* 2015). In Cosmetidae, however, the genital morphology is somewhat uniform, if compared with Gonyleptidae for example. In the species of *Eulibitia* only the size of MS D2 varies. It is probable that the genital morphology in Cosmetidae is more useful in defining genera or suprageneric groups (e.g., the enormous caruncle of the stylus in *Libitia*, the small MS A in *Ambatoiella* and the long VP in Discosomaticinae such as *Gryne*).

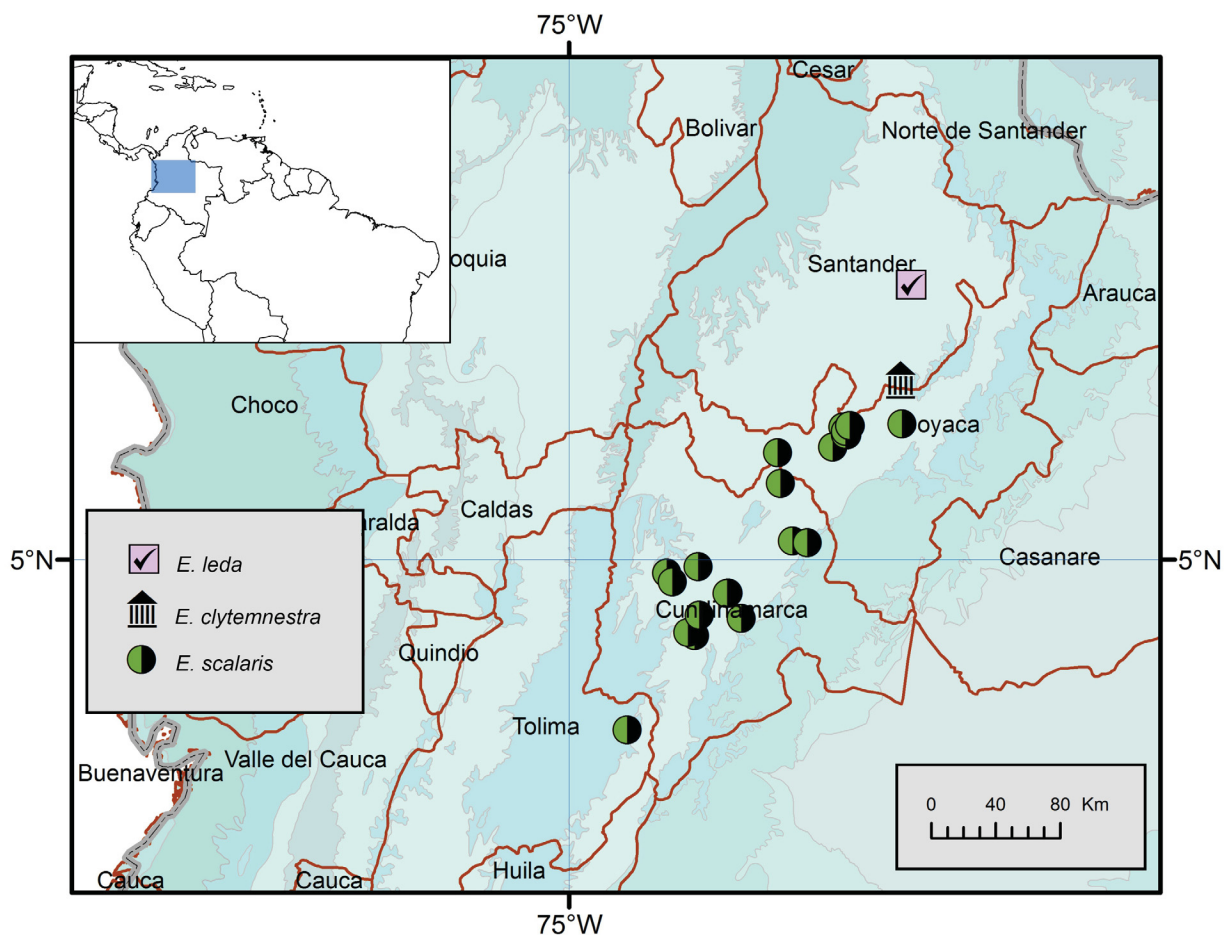


**Fig. 32.** Northern Andes in Colombia, showing localities for *Eulibitia maculata* Roewer, 1912 and *E. h-inscriptum* (Mello-Leitão, 1941) comb. nov. Colored patches on the background represent WWF ecoregions.

### Relationships of *Eulibitia*

The Andean genera *Ambatoiella*, *Libitia* and *Libitiella* seem to be related to *Eulibitia* in having: (1) legs short and femur IV sometimes slightly curved; (2) body almost unarmed, with tubercles or spines short or minute in the scutal areas; (3) absence of marked sexual dimorphism, such as hypertelic chelicera in males; (4) basitarsomeres of leg I of males clearly thicker than distitarsomeres (except in *Ambatoiella*, where they are monomorphic, equally sturdy), but not enormously enlarged as in other more distantly related genera (e.g., *Cumbalia* Roewer, 1963, Fig 2); (5) macrosetae D1 closer to C2 than to D2; and (6) presence of a soft latero-distal area on VP (at macrosetae D1) which may be sunken, forming a noticeable notch (Figs 4A, E, 14A, 18A, 22A, 26A, 30B). Although no phylogenetic analyses have been carried out in Cosmetidae, these genera seem to form a natural group. *Cumbalia* shows other differences to the core of the *Eulibitia*-like Andean genera, such as: (1) the basalmost basitarsomere is much longer than the second one (as opposed to being subequal, regardless of whether counting two or three articles) and (2) Mt III and IV of male tapering (as opposed to ordinarily cylindrical rods).

However, some features allow us to diagnose *Eulibitia* in contrast to these other Andean genera: (1) shape of DS and lateral projections of protoglyphs (Fig. 1); (2) armature of basichelecerite (almost smooth in *Libitia*, Fig. 4C–D); (3) presence of teeth on movable and fixed fingers of cheliceral hand (absent in *Ambatoiella*, Fig. 4B, F); (4) absence of pectination formed by strong proventral spiniform



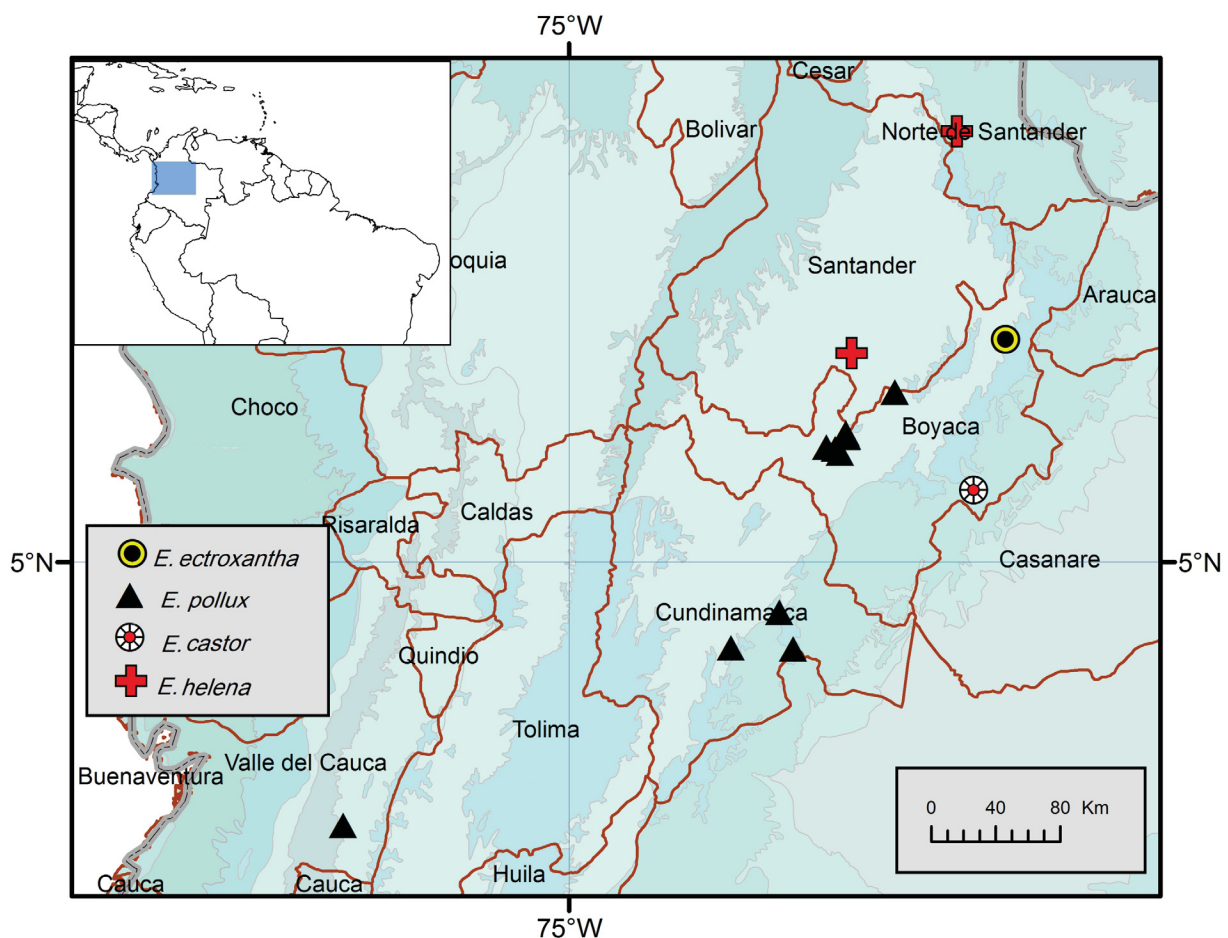
**Fig. 33.** Northern Andes in Colombia, showing localities for *Eulibitia leda* sp. nov., *E. clytemnestra* sp. nov. and *E. scalaris* (Sørensen in Henriksen, 1932) comb. nov. Colored patches on the background represent WWF ecoregions.

apophyses on distal  $\frac{3}{4}$  of Cx IV in male (present in *Ambatoiella*); (5) Mt I 15% to 30% longer than Ta I (as opposed to subequal in the others); (6) normal-sized basitarsomeres of legs III–IV (much thicker in males of *Libitia*, Fig. 2); (7) basitarsomeres of leg IV trimerous as in *Ambatoiella* (5 articles in *Eulibitia* and 6–7 in *Cumbalia*); and (8) size of macrosetae A1–A2 of penis ventral plate (short in *Ambatoiella*, Fig. 4A, E).

On the other hand, the genus *Eulibitia* also seems to be related to the Amazonian genus *Taito*, which exhibits common characteristics like beta-type DS, clavi inguines sometimes present, slight sexual dimorphism and a transverse yellow stripe on the posterior margin of the scutum. However, this genus differs from *Eulibitia* by: (1) presence of equuleus in DS; (2) posterior margin of scutum never with paramedian tubercles; (3) anal operculum of males sometimes with robust tubercles; (4) legs long and slender; and (5) dorsal apophysis of coxa IV large and directed backwards; in addition to this are the features mentioned in Kury & Barros (2014) as possible synapomorphies, such as the calli (latero-distal projections of the truncus), which are not present in species of *Eulibitia* (Fig. 26).

### Remarks on distribution

The genus *Eulibitia* is confined to the northern Andean montane forests of Colombia, with a marked preference for the Magdalena Valley montane forest (NT0136) and Northern Andean páramo (NT1006)



**Fig. 34.** Northern Andes in Colombia, showing localities for *Eulibitia ectroxantha* (Mello-Leitão, 1941) comb. nov., *E. pollux* sp. nov., *E. castor* sp. nov. and *E. helena* sp. nov. Colored patches on the background represent WWF ecoregions.



ecoregions, in two biomes: tropical and subtropical moist broadleaf forests, and montane grasslands and shrubland.

Species of *Eulibitia* are widely sympatric, which is why they are presented here on three maps (Figs 32–34) to avoid a muddled overlap. *Eulibitia scalaris* is the most abundant species in collections and the most widespread, occurring in three different biomes corresponding to three ecoregions: tropical and subtropical moist broadleaf forests (Magdalena Valley montane forests – NT0136), tropical and subtropical dry broadleaf forests (Magdalena Valley dry forests – NT0221) and montane grasslands and shrubland (Northern Andean páramo – NT1006).

There is a single point of occurrence of *E. pollux* sp. nov. in the Cauca Valley montane forest ecoregion (NT0109), in Palmira (Valle del Cauca), a place isolated from the other records of the species and even the genus. The marked preference of species of *Eulibitia* for the Northern Andean páramo (NT1006) ecoregion, contrasting with the lowland city Palmira (1040 m a.s.l.) and the Magdalena River and the Central Cordillera as physical barriers, suggest that this record should be considered doubtful.

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