European Journal of Taxonomy 813: 87–102
https://doi.org/10.5852/ejt.2022.813.1735
ISSN 2118-9773
www.europeanjournaloftaxonomy.eu
2022 · Sánchez-Ruiz A. *et al.*

Research article

urn:lsid:zoobank.org:pub:8FF7D8D9-A18B-4C1A-9F2D-301EBFEA8B26

An update on the spider genus *Caponina* Simon (Araneae: Caponiidae) with descriptions of three new six-eyed species from Colombia

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Abstract. Three new six-eyed species of the spider genus *Caponina* Simon, 1891 are described, photographed, diagnosed and illustrated: *C. alejandroi* sp. nov. (male and female) from the Boyacá Department, *C. bochalema* sp. nov. (male) from the Santander Department and *C. huila* sp. nov. (male) from the Huila Department. Also, a emended diagnosis for the genus, a distribution map and an identification key for all species of *Caponina* are provided.

Key words. Synspermiata, Caponiinae, taxonomy, Neotropical region.

Sánchez-Ruiz A., Martínez L. & Bonaldo A.B. 2022. An update on the spider genus *Caponina* Simon (Araneae: Caponiidae) with descriptions of three new six-eyed species from Colombia. *European Journal of Taxonomy* 813: 87–102. https://doi.org/10.5852/ejt.2022.813.1735

Introduction

The family Caponiidae Simon, 1890 is traditionally divided into two subfamilies following Petrunkevitch (1939): Nopinae, an exclusive New World subfamily, is a monophyletic linage characterized by having adesmatic joins on the tarsi (Sánchez-Ruiz & Brescovit 2018); and the nominal Caponiinae includes all other non-nopine genera, grouped solely by the absence of this modification on the tarsi. The caponiines also lack additional apomorphies of most nopines, such as the membranous structures on legs (crista, gladius and arolium; Brescovit & Sánchez-Ruiz 2016). This assemblage is composed by presumably basal and possibly paraphyletic genera, and it is considered artificial since it is only supported by the absence of obvious nopine leg apomorphies (Platnick 1994a; Kranz-Baltensperger *et al.* 2009).

Caponina Simon, 1892 is the most diverse non-nopine genus, comprising 12 species distributed in the Caribbean and in Central and South America (World Spider Catalog 2021). The genus was proposed by Simon (1892) based on a female from St. Vincent Island (*C. testacea* Simon, 1892). Unfortunately, Simon (1892) described this species as having two eyes when in fact it has four, as later demonstrated by Platnick (1994a).

The eye counting error in the original description of the type species led subsequent authors to misplace no less than six species in *Caponina*. Simon (1893), Pickard-Cambridge (1899) and Bryant (1940) included three species in the genus from Venezuela (*C. longipes* Simon, 1893), Guatemala (*C. sargi* Pickard-Cambridge, 1899) and Cuba (*C. pelegrina* Bryant, 1940), respectively; all these species were based on two-eyed female specimens. Platnick (1994a) concluded that these species are misplaced in the genus but did not transfer them to other genera, since they represent undescribed lineages of either Caponiinae or Nopinae, a situation that is yet to be solved. The other three misplacements in *Caponina* are already resolved: *C. blanda* Bryant, 1942 from the Virgin Islands (transferred to *Nops* MacLeay, 1839 by Chickering, 1967); *C. darlingtoni* Bryant, 1948 from Hispaniola (transferred to *Cubanops* Sánchez-Ruiz, Platnick & Dupérré, 2010 by Sánchez-Ruiz *et al.* 2010); and *C. leopoldi* Zapfe, 1962 from Chile (transferred to *Tisentnops* Platnick, 1994 by Platnick 1994b).

The first modern revision of *Caponina* was presented by Platnick (1994a), who accurately defined the generic limits, proposed six new species and synonymized *Bruchnops* Mello-Leitão, 1939 with *Caponina*. Recently, the six-eyed *C. papamanga* Brescovit & Sánchez-Ruiz, 2013 was described from Brazil, representing the first *Caponina* record from the Brazilian Amazonia.

Two species are recorded from Colombia, *C. paramo* Platnick, 1994 from Cundinamarca Department and *C. chinacota* Platnick, 1994 from North of Santander Department. In this paper, we described three new six-eyed species of *Caponina* from that country, providing a detailed description of somatic and genitalic characteristics, line drawings of copulatory structures, as well as images of the habitus, male palpal morphology and female genitalia. Furthermore, the revision of *Caponina* made by Platnick (1994a) is updated, including an emended diagnosis for the genus, a distribution map and an identification key for all known species. An effort is made to standardize the nomenclature of some structures of the female internal genitalia to improve stability for future taxonomic studies, establishing homology hypotheses to be tested in phylogenetic analyses.

Material and methods

All specimens examined are deposited in the collections of the Instituto Alexander von Humboldt, Bogotá, Colombia (IAvH-I, curator: J.C. Neita). All type specimens are in good conditions of preservation; the left male palp and female internal genitalia of types were dissected for detailed examination and are stored in microvials inside their respective vials.

Multifocal images were taken with the Leica MC-190 HD digital camera attached to S8AP0 Leica stereo microscope with extended focal range. All multifocal images were assembled using Helicon Focus Pro ver. 5.3.14. Measurements are expressed in millimeters (mm) and were made using an ocular micrometer. Descriptions and terminology for copulatory structures mostly follow Sánchez-Ruiz & Brescovit (2018), but some terms for the female internal genitalia are newly introduced. Coloration patterns are described based on specimens preserved in 70–80% ethanol. Female genital organs of *C. alejandroi* sp. nov. were dissected with fine forceps and scalpel and their soft tissues were digested for 24 hours in a solution of pancreatin, following the procedures recommended by Álvarez-Padilla & Hormiga (2007).

Figures were edited and prepared using Adobe Photoshop® CS ver. 12.0. Maps were prepared in QGIS (QGIS Development Team 2021). Locality coordinates of new species were obtained from specimen

labels and converted to the DMS format (degrees, minutes and seconds). The Andes Mountains are represented in the distribution map using the high-resolution shapefile of the Andean biogeographical region proposed by Romano (2017). The collection sites of previously known species were located based on approximate coordinates obtained from Google Maps®. Locality elevations refer to meters above sea level.

Institutional abbreviations

IAvH = Instituto Alexander von Humboldt (curator: J.C. Neita), Bogotá, Colombia

Morphological abbreviations

ae = anterolateral extensions on the pair of sclerotized bars
AME = anterior median eyes
ALE = anterior lateral eyes
ap = anterior plate
cy = cymbium
dt = dorsal tubercle on palpal femur
e = embolus
ess = external sclerotization around spiracles
go = genital opening
PLE = posterior lateral eyes
pp = posterior plate
ps = posterior spiracles
psb = pair of sclerotized bars
t = tegulum

Results

Taxonomy

Class Arachnida Cuvier, 1812
Order Araneae Clerck, 1757
Family Caponiidae Simon, 1890

Genus ***Caponina*** Simon, 1892

Caponina Simon, 1892: 573 (type species *C. testacea* Simon, 1892 by monotypy).
Bruchnops Mello-Leitão, 1939: 629; type species *B. notabilis* Mello-Leitão (by monotypy), synonymized by Platnick (1994a).

Emended diagnosis

Members of *Caponina* can be distinguished from all genera of Nopinae by having the tarsi entire, lacking adesmatic joins; and from other non-nopine genera with six or four eyes such as *Nasutonops* Brescovit & Sánchez-Ruiz, 2016, *Iraponia* Kranz-Baltensperger, Platnick & Dupérré, 2009 and *Notnops* Platnick, 1994 as follows: from the six-eyed *Nasutonops* by the lack of a clypeal horn on the carapace; from the six-eyed *Iraponia* by the lack of a postepigastric scutum on the abdominal venter in males and by having a pair of sclerotized bars on the female internal genitalia, lacking the anteromedian receptaculum; and from the four-eyed *Notnops* by having the embolus protruding ventrally from the apical median area of the tegulum in males (instead of from the posterior area), and by the lack of an anteromedian receptaculum in the female internal genitalia. Other representatives of non-nopine genera such as *Calponia* Platnick, 1993 and *Caponia* Simon, 1887 have eight eyes; *Diploglena* Purcell, 1904,

Laoponia Platnick & Jäger, 2008, *Taintnops* Platnick, 1994 and *Tisentnops* Platnick, 1994 have only two eyes, and *Carajas* Brescovit & Sánchez-Ruiz, 2016 is completely devoid of eyes.

Key for all species of *Caponina* Simon, 1892

1. Four eyes (rarely three) 2
– Six eyes (rarely five) 3

2. Female internal genitalia with anterior expansions on the pair of sclerotized bars; sclerotization around spiracles narrow, widely separated from each other (Platnick 1994a: fig. 22) ..... ***C. testacea*** Simon, 1892 (males unknown)
– Female internal genitalia lacking anterior expansions on the pair of sclerotized bars; sclerotizations around spiracles widened, almost touching each other (Platnick 1994a: fig. 23) ..... ***C. tijuca*** Platnick, 1994 (males unknown)

3. Males (those of *C. chinacota* and *C. cajabamba*, unknown) 4
– Females (those of *C. bochalema* sp. nov. and *C. huila* sp. nov., unknown) 11

4. Cymbium short, length not reaching twice palpal tibia length (Fig. 3E, G) 5
– Cymbium long, length more than twice as long as palpal tibia length (Fig. 3H, J) 8

5. Palpal femur with pronounced dorsal tubercle (Fig. 1E–G) 6
– Palpal femur without dorsal tubercle (Platnick 1994a: figs 29, 31) ..... ***C. notabilis*** (Mello-Leitão, 1939)

6. Tegulum round or oval, large, length greater than or equal to cymbium length (Fig. 3E–G) 7
– Tegulum pear-shaped, small, length shorter than cymbium (Fig. 1E–G) ..... ***C. alejandroi*** sp. nov.

7. Tegulum round, embolus with very thin and long tip and small opening (Brescovit & Sánchez-Ruiz 2013: figs 5, 7–9) ..... ***C. papamanga*** Brescovit & Sánchez-Ruiz, 2013
– Tegulum oval, embolus with thick, short and sharp tip and large opening (Fig. 3E–G) ..... ***C. bochalema*** sp. nov.

8. Embolus base anteriorly directed (Fig. 3H–J) 9
– Embolus base posteriorly directed (Platnick 1994a: figs 39–41) ..... ***C. paramo*** Platnick, 1994

9. Tegulum pear-shaped, small; palpal femur with dorsal tubercle 10
– Tegulum oval, large; palpal femur without dorsal tubercle (Platnick 1994a: figs 26–28) ..... ***C. alegre*** Platnick, 1994

10. Palpal femur with a pronounced dorsal tubercle; cymbium very thick with pronounced curvature and squared tip (Platnick 1994a: figs 36–38) ..... ***C. chilensis*** Platnick, 1994
– Palpal femur with a moderate dorsal tubercle; cymbium cylindrical with moderate curvature and rounded tip (Fig. 3H–J) ..... ***C. huila*** sp. nov. (females unknown)

11. Internal genitalia with concave or straight sclerotization around spiracles on posterior plate (Platnick 1994a: figs 24–25, 35) 12
– Internal genitalia with convex sclerotization around spiracles on posterior plate (Platnick 1994a: figs 32–34) 14

12. Sclerotization around spiracles on posterior plate concave; pair of sclerotized bars with anterolateral extensions (Platnick 1994a: figs 24, 35) 13

– Sclerotization around spiracles on posterior plate straight; pair of sclerotized bars without anterolateral extensions (Platnick 1994a: fig. 25) .....***C. notabilis*** (Mello-Leitão, 1939)

13. Sclerotization around spiracles on posterior plate broad; pair of sclerotized bars anteriorly widened, with long and thin anterolateral extensions (Platnick 1994a: fig. 35) ... ***C. chinacota*** Platnick, 1994
– Sclerotization around spiracles on posterior plate narrow; pair of sclerotized bars anteriorly narrow, with short and thick anterolateral extensions (Platnick 1994a: fig. 24) ..... ***C. alegre*** Platnick, 1994

14. Anterolateral extensions on the pair of sclerotized bars elongated, size reaching at least a third or more of the pair of sclerotized bars (Figs 1I, 2E; Platnick 1994a: fig. 33) 15
– Anterolateral extensions on the pair of sclerotized bars absent or short, size not reaching a fifth of the pair of sclerotized bars (Platnick 1994a: figs 32, 34) 16

15 Sclerotization around spiracles touching at middle of abdomen, forming a single piece of sclerotization; pair of sclerotized bars broad with club-shaped anterolateral extensions fused in the apical third of the pair of sclerotized bars (Platnick 1994a: fig. 33) .... ***C. cajabamba*** Platnick, 1994
– Sclerotization around spiracles not touching; pair of sclerotized bars narrow with elongated, thin, boomerang-shaped anterolateral extensions fused from the base to the middle of the pair of sclerotized bars (Figs 1H–I, 2D–E) ..... ***C. alejandroi*** sp. nov.

16. Sclerotization around spiracles not touching (Platnick 1994a: figs 32; Brescovit & Sánchez-Ruiz 2013: fig. 10) 17
– Sclerotization around spiracles touching at middle of abdomen, forming a single piece of sclerotization (Platnick 1994a: fig. 34) .....***C. paramo*** Platnick, 1994

17 Pair of sclerotized bars wide and dorsolaterally folded; anterolateral extensions absent (Platnick 1994a: fig. 32) .....***C. chilensis*** Platnick, 1994
– Pair of sclerotized bars narrow, with club-shaped apical ends; anterolateral extensions very short (Brescovit & Sánchez-Ruiz 2013: fig. 10) .....***C. papamanga*** Brescovit & Sánchez-Ruiz, 2013

Caponina alejandroi sp. nov.
urn:lsid:zoobank.org:act:A3FDEA0F-C665-48D3-8F89-71B28114C022
Figs 1A–I, 2A–E, 5A–D, 6B

Diagnosis

Males of *C. alejandroi* sp. nov. resembles those of *C. bochalema* sp. nov. (Fig. 3E–G) by a short and pointed cymbium that does not reach over twice the tibia length, but can be distinguished by a smaller tegulum, pear-shaped in lateral view (its size is less than the cymbium length), by a thicker embolus with rhomboidal tip (Fig. 2A–C), and by having a more pronounced dorsal tubercle on the palpal femur (Fig. 1E–G). Females can be distinguished from other known species of *Caponina* by having long, boomerang-shaped internal pair of sclerotized bars (psb) with elongated and thin boomerang-shaped anterolateral extensions (ae) fused from the base to the middle of the pair of sclerotized bars (Figs 1H–I, 2D–E).

Etymology

The specific name is a patronym in honor of Alejandro Sánchez Barreda, the youngest son of the first author.

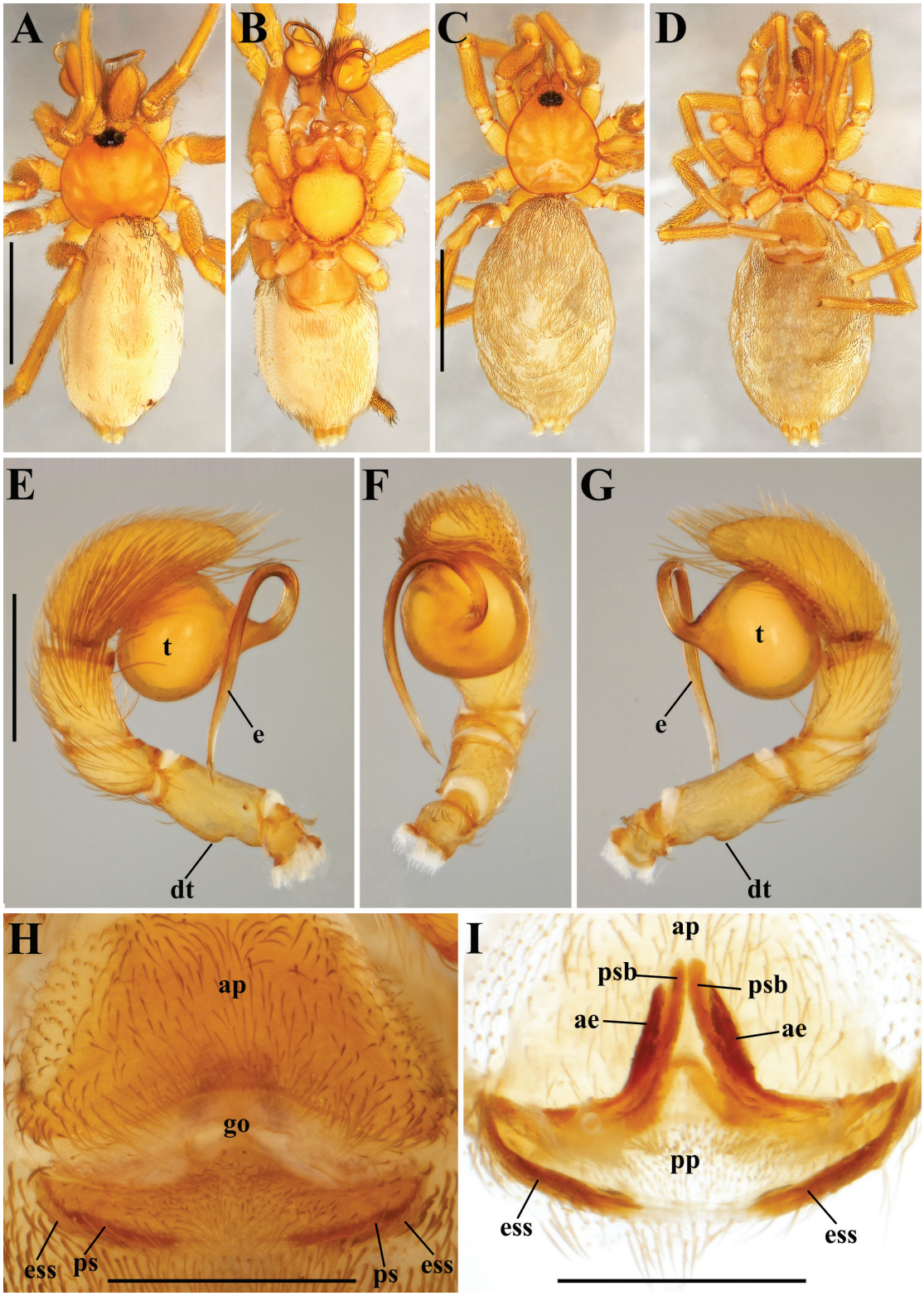

Fig. 1. *Caponina alejandroi* sp. nov. **A–B**, **E–G**. ♂, holotype (IAvH-I 3747). **C–D**, **H–I**. ♀, paratype (IAvH-I 3749). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C**. Habitus, dorsal view. **D**. Habitus, ventral view. **E**. Left palp, retrolateral view. **F**. Left palp, ventral view. **G**. Left palp, prolateral view. **H**. External genitalia, ventral view. **I**. Internal genitalia, dorsal view. Scale bars: A–D = 1.5 mm; E–G = 1 mm; H–I = 0.5 mm. Abbreviations: see Material and methods.

Type material

Holotype

COLOMBIA • ♂; Boyacá Department, Santuario de Flora y Fauna Iguaque, El Caimo, Sector Chaina; 5°25′ N, 73°27′ W; alt. 2730 m; 24 Sep. 2003; A. Roberto leg.; IAvH-I 3747.

Paratypes

COLOMBIA • 1 ♂; same collection data as for holotype; IAvH-I 3114 • 1 ♀; same collection data as for holotype; 12 Jul. 2001; IAvH-I 3755 • 1 ♂; Boyacá Department, Villa de Leyva, Colegio Antonio Nariño; 5°38′ N, 73°31′ W; alt. 2200 m; 21 Jul. 2002; E. Rodríguez leg.; IAvH-I 3750 • 1 ♀; same collection data as for preceding; L. Piña leg.; IAvH-I 3749 • 1 ♀; Boyacá Department, Vereda Sopotá, Finca El Peladero; 5°37′31.2″ N, 73°32′37.9″ W; alt. 2185 m; Oct. 2004; C. Fagua leg.; IAvH-I 3115.

Description

Male (holotype, IAvH-I 3747**)**

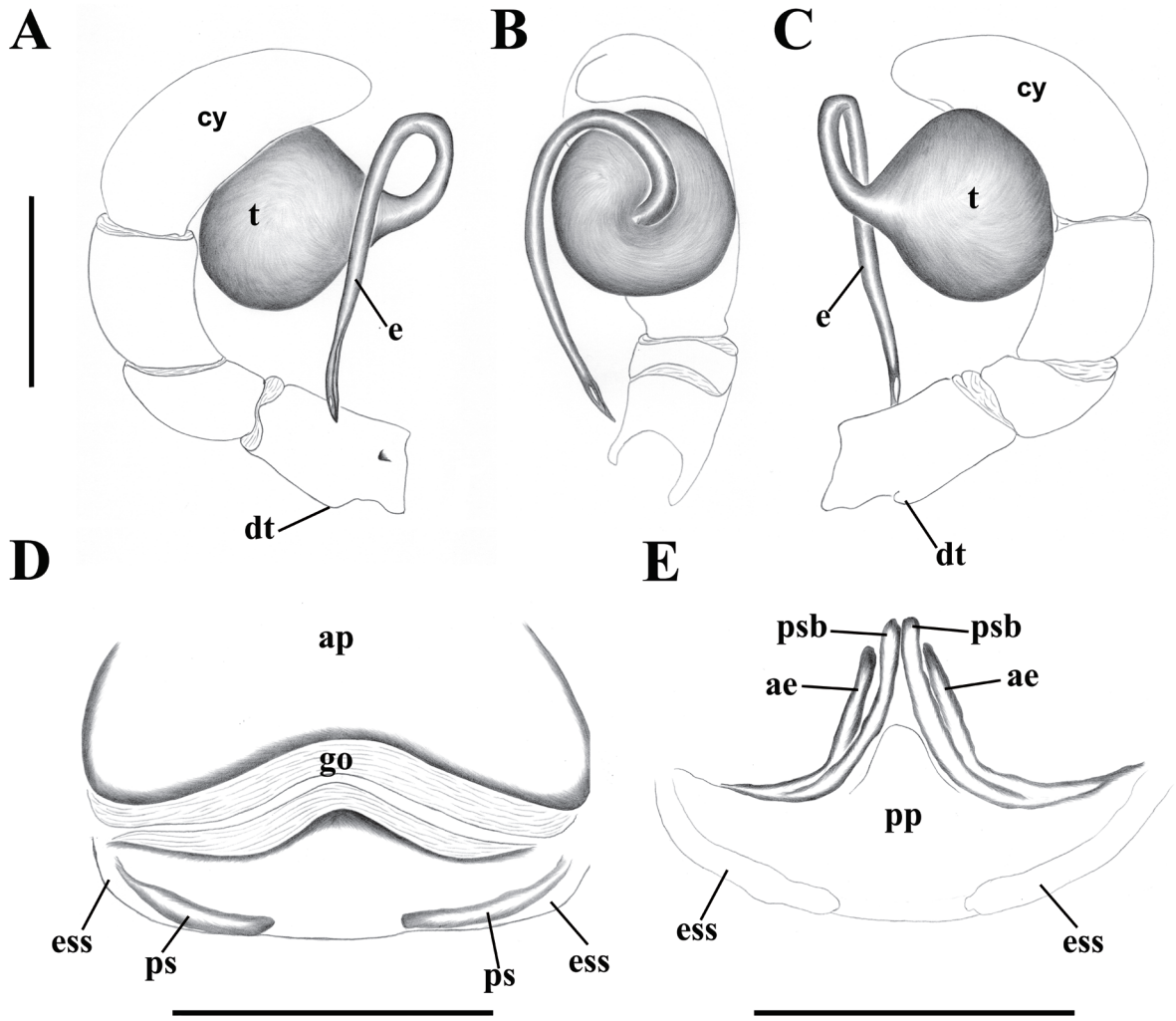

Fig. 2. *Caponina alejandroi* sp. nov. **A**–**C**. ♂, holotype (IAvH-I 3747). **D**–**E**. ♀, paratype (IAvH-I 3749). **A**. Left palp, retrolateral view. **B**. Left palp, ventral view. **C**. Left palp, prolateral view. **D**. External genitalia, ventral view. **E**. Internal genitalia, dorsal view. Scale bars: A–D = 1.5 mm; E–G = 1 mm; H–I = 0.5 mm. Abbreviations: see Material and methods.

Coloration. Carapace pale orange (Figs 1A, 5A). Chelicerae, endites, labium, sternum and legs pale orange (Figs 1A, 5A). Abdomen pale beige (Fig. 1A–B), covered by many dark, short setae, epigastric region pale orange. Spinnerets pale beige.

Measurements. Total length 3.53; carapace 1.36 long, 1.21 wide, 0.48 high; sternum 0.92 long, 0.88 wide; legs: I: 4.10; II: 3.84; III: 3.14; IV: 4.63; abdomen 2.15 long.

Morphology. Carapace flat with soft cuticle. Six eyes, AME the largest, dark, separated by about half their diameter, ALE pale translucent, smaller than AME, PLE pale translucent and smaller than ALE. Palpal femur with protuberant dorsal tubercle and small prolateral stridulatory pick (Fig. 1E), cymbium short and pointed, tegulum pear-shaped in lateral view, with very long embolus directed anteriorly protruding ventrally from approximately middle surface of tegulum, embolus tip rhomboidal, very fine and sharp (Figs 1E–G, 2A–C).

Female (paratype, IAvH-I 3749)

Coloration. As in male (Figs 1C–D, 5C–D).

Measurements. Total length 4.95, carapace 1.54 long, 1.30 wide, 0.36 high, sternum 0.93 long, 0.87 wide, legs: I: 4.57; II: 4.27; III: 3.50; IV: 4.55, abdomen 3.18 long.

Morphology. Carapace and eyes as in male. External genitalia with wide epigastric furrow (Figs 1H, 2D); internal genitalia with long, anteriorly directed, boomerang-shaped pair of sclerotized bars, with elongated, boomerang-shaped anterolateral extensions fused from base to middle of sclerotized bars (Figs 1I, 2E).

Distribution

Known from Boyacá Department, Colombia (Fig. 6B).

Caponina bochalema sp. nov.

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Figs 3A–B, E–G, 4A–C, 5E–F, 6B

Diagnosis

Males of *Caponina bochalema* sp. nov. can be easily distinguished from other Colombian species by having a small, acuminated cymbium, a large and oval tegulum (size greater than cymbium length), and an embolus with a short and needle-shaped tip (Figs 3E–G, 4A–C).

Etymology

The specific epithet is a toponymic, referring to the type locality.

Type material

Holotype

COLOMBIA • ♂; Santander Department, Municipality of Bochalema, Parque Nacional Natural Tamá, Finca Campesina; 7°31′53.14″ N, 72°19′23.94″ W; alt. 1450–1600 m; 30 Apr. 2004; E. González leg.; IAvH-I 3757.

Description

Male (holotype, IAvH-I 3757)

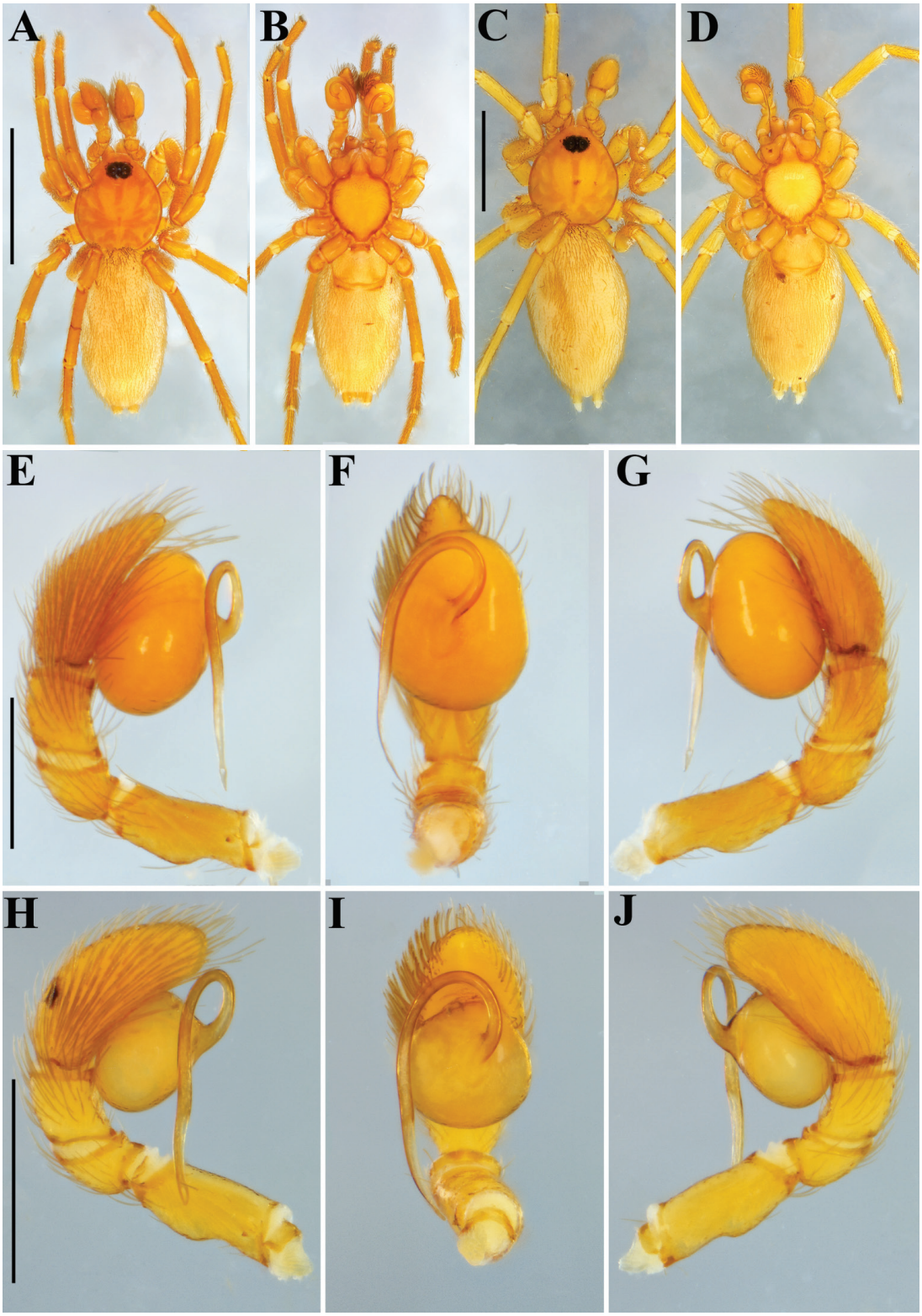

Fig. 3. A–B, **E–G**. *Caponina bochalema* sp. nov., ♂, holotype (IAvH-I 3757). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **E**. Left palp, retrolateral view. **F**. Left palp, ventral view. **G**. Left palp, prolateral view. – **C–D**, **H–J**. *Caponina huila* sp. nov., ♂, holotype (IAvH-I 3761). **C**. Habitus, dorsal view. **D**. Habitus, ventral view. **H**. Left palp, retrolateral view. **I**. Left palp, ventral view. **J**. Left palp, prolateral view. Scale bars: A–D = 1.5 mm; E–J = 1 mm.

Coloration. Carapace pale orange (Figs 3A, 5E). Chelicerae, endites, labium, sternum and legs pale orange (Figs 3B, 5F). Abdomen pale beige (Fig. 3A–B), covered by many brown and short setae, epigastric region pale orange. Spinnerets pale beige.

Measurements. Total length 3.18, carapace 1.25 long, 1.08 wide, 0.29 high, sternum 0.80 long, 0.71 wide, legs: I: 3.44; II: 3.29; III: 3.00; IV: 4.07, abdomen 2.15 long.

Morphology. Carapace flat with soft cuticle. Six eyes, AME largest, dark, separated by about half their diameter, ALE pale translucent and smaller than AME, PLE pale translucent and smaller than ALE. Palpal femur with dorsal tubercle and small prolateral stridulatory pick (Fig. 3E); cymbium very small and pointed, tegulum very large and oval, with long and thin embolus directed anteriorly protruding ventrally from approximately middle surface of tegulum, embolus tip short and sharp (Figs 3E–G, 4A–C).

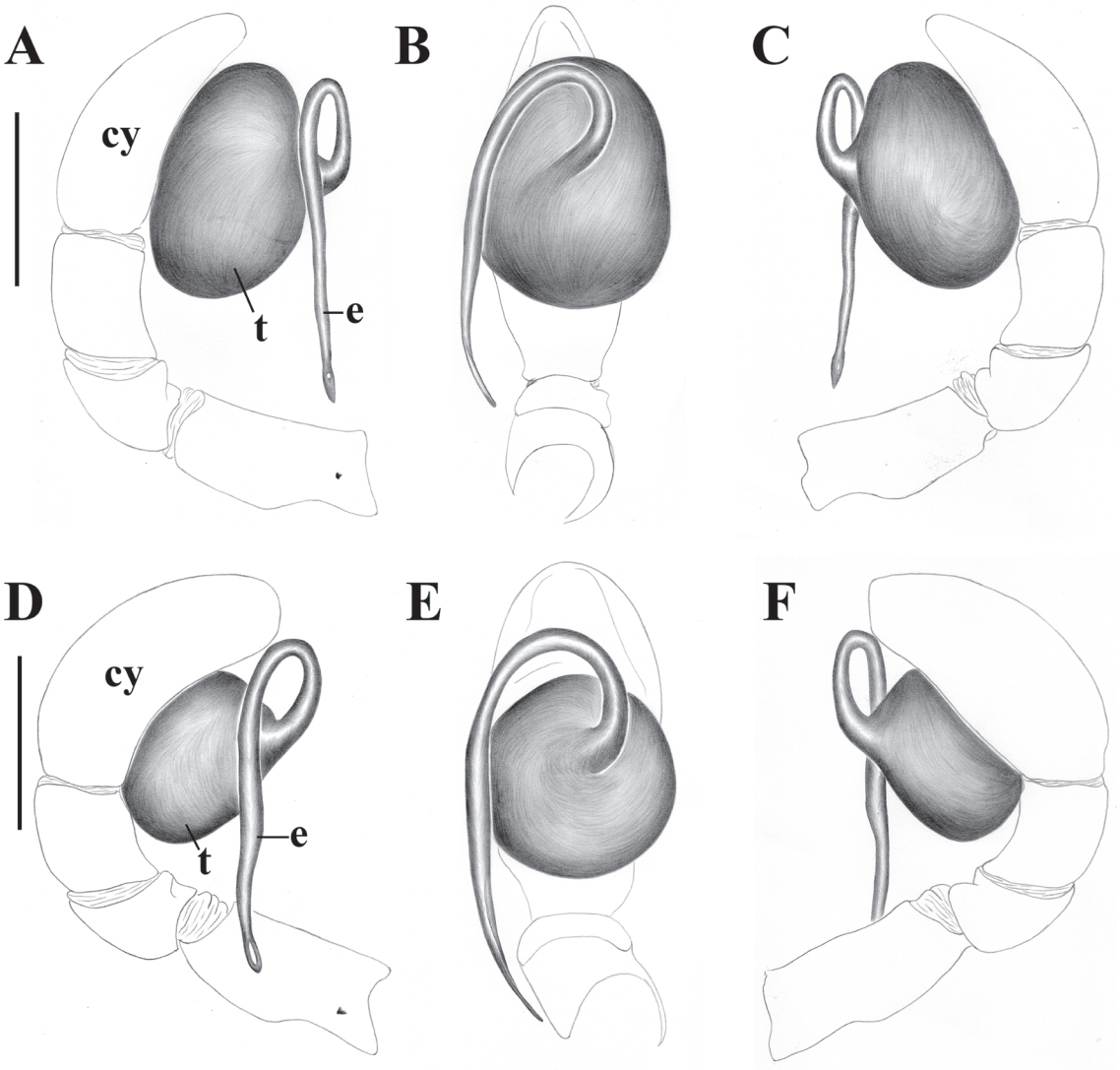

Fig. 4. A–C. *Caponina bochalema* sp. nov., ♂, holotype (IAvH-I 3757). **A**. Left palp, retrolateral view. **B**. Left palp, ventral view. **C**. Left palp, prolateral view. – **D–F**. *Caponina huila* sp. nov., ♂, holotype (IAvH-I 3761). **D**. Left palp, retrolateral view. **E**. Left palp, ventral view. **F**. Left palp, prolateral view. Scale bars = 1 mm. Abbreviations: see Material and methods.

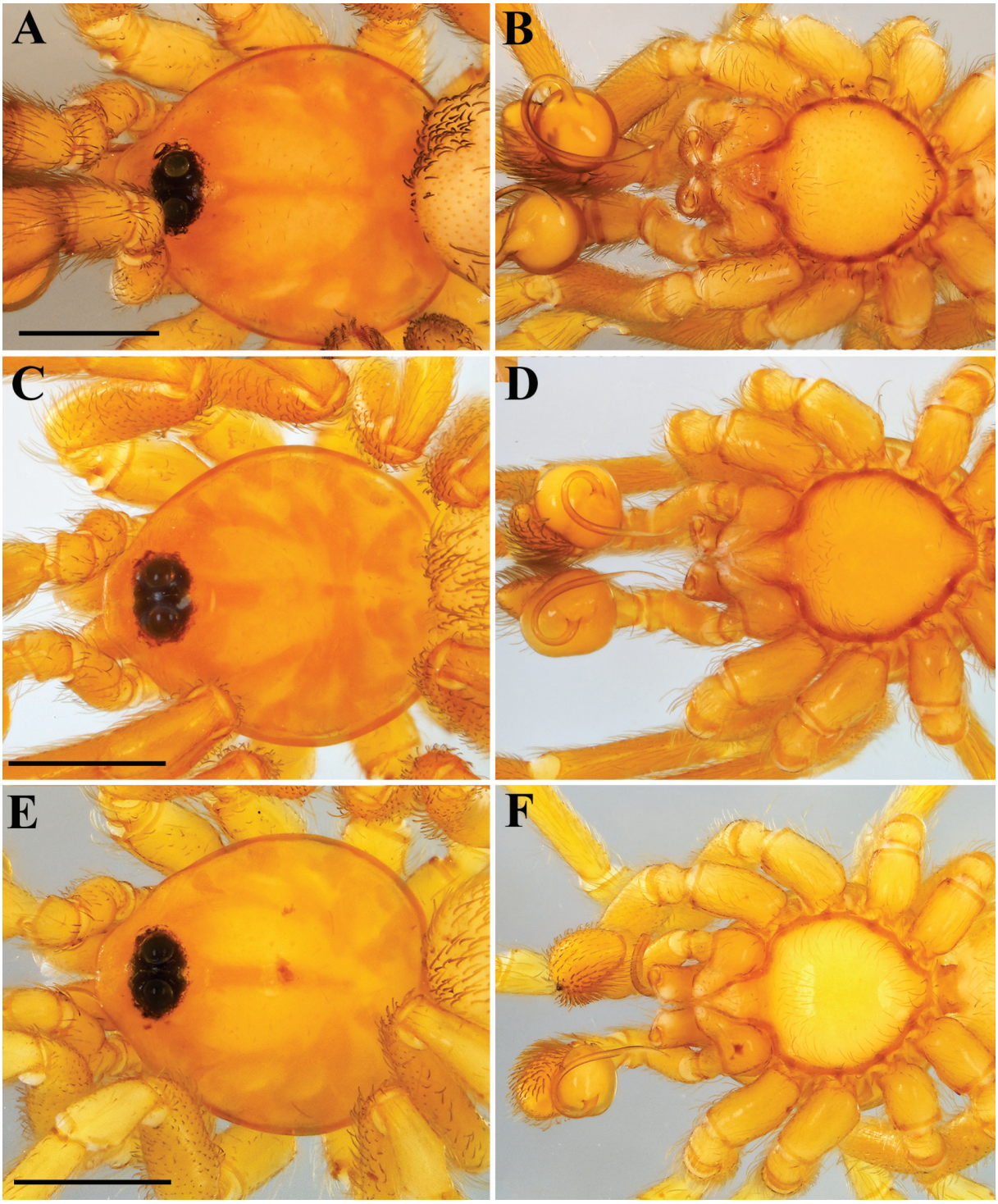

Fig. 5. A–B. *Caponina alejandroi* sp. nov., ♂, holotype (IAvH-I 3747). **A**. Prosoma, dorsal view. **B**. Prosoma, ventral view. – **C–D**. *Caponina bochalema* sp. nov., ♂, holotype (IAvH-I 3757). **C**. Prosoma, dorsal view. **D**. Prosoma, ventral view. – **E–F**. *Caponina huila* sp. nov., ♂, holotype (IAvH-I 3761). **E**. Prosoma, dorsal view. **F**. Prosoma, ventral view. Scale bars = 1.5 mm.

Female

Unknown.

Distribution

Known only from the type locality (Fig. 6B).

Caponina huila sp. nov.

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Figs 3C–D, H–J, 4D–F, 5G–H, 6B

Diagnosis

Males of *C. huila* sp. nov. resemble those of *C. paramo* by a large cymbium that is more than twice as long as the tibia length, and by a similar poorly pronounced dorsal tubercle on the palpal femur (Fig. 3H–J), but can be distinguished by having a anteriorly directed embolar base (Fig. 4D–F), instead posteriorly directed as in *C. paramo* (see Platnick 1994a: figs 39–41). Additionally, the embolus tip is larger than that of *C. paramo*, presenting a median expansion, widening tip and enlarged opening (Figs 3H–J, 4D–F).

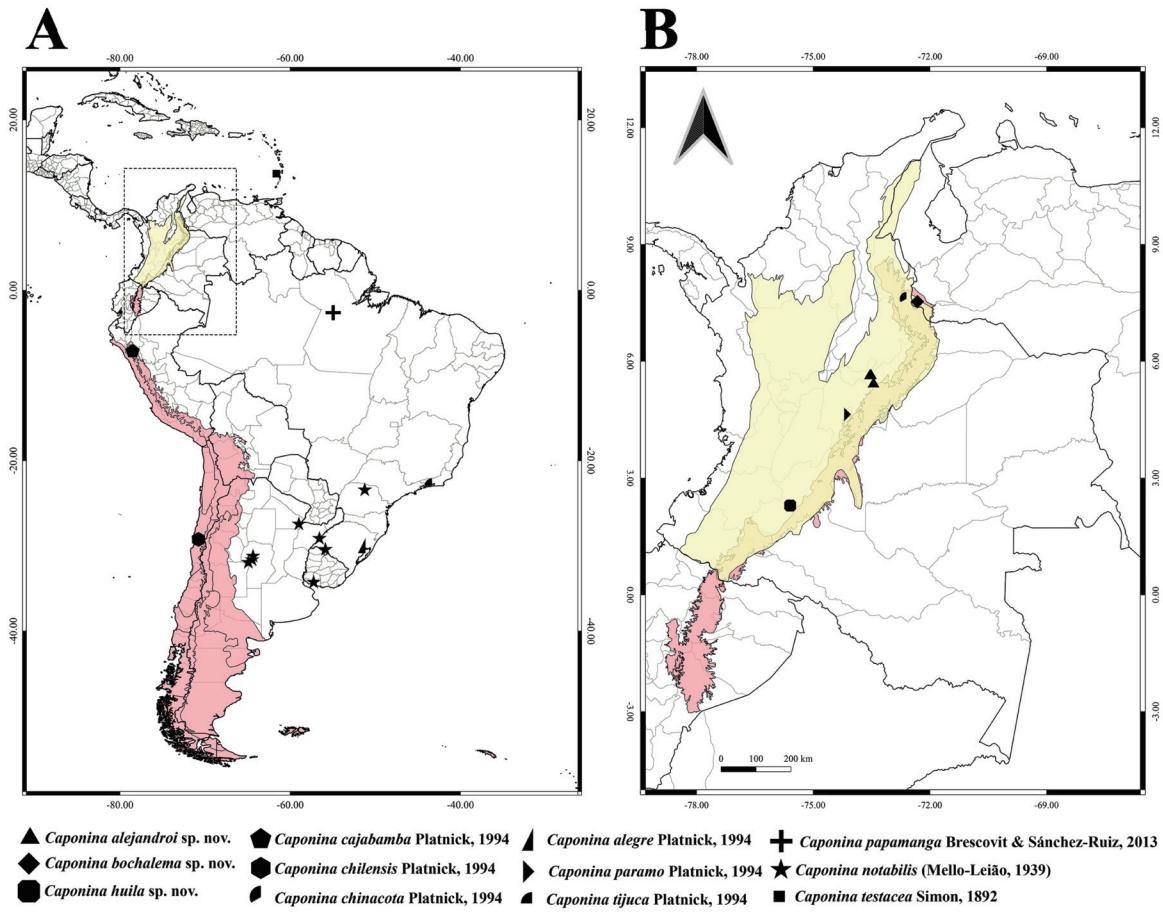

Fig. 6. Distribution map of species of *Caponina*. **A**. General distribution in the Neotropics, excluding Colombian species. **B**. Distribution of Colombian species. Total extension of Andean cordillera in South American is represented in pink and Colombian Andes in yellow.

Etymology

The specific epithet is a toponymic, referring to the type locality.

Type material

Holotype

COLOMBIA • ♂; Huila Department, Garzón, Vereda El Espinal, Reserva privada "Taky-Huaylla"; 2°17′43″ N, 75°35′37″ W; alt.1000 m; 16–19 Sep. 2002; M. Ospina leg.; IAvH-I 3761.

Description

Male (holotype, IAvH-I 3761)

Coloration. Carapace yellowish-orange (Figs 3C, 5G). Chelicerae, endites, labium, sternum and legs yellowish-orange (Figs 3D, 5H). Abdomen pale beige (Fig. 3C–D), covered by many dark, short setae, epigastric region pale orange. Spinnerets pale beige.

Measurements. Total length 3.65, carapace 1.34 long, 1.17 wide, 0.38 high, sternum 0.85 long, 0.80 wide, legs: I: 3.51; II: 3.35; III: 2.76; IV: 4.16, abdomen 2.25 long.

Morphology. Carapace flat with soft cuticle. Six eyes, AME the largest, dark, separated by about half their diameter, ALE pale translucent and smaller than AME, PLE pale translucent and smaller than ALE. Palpal femur with poorly developed dorsal tubercle and small prolateral stridulatory pick (Fig. 3H); cymbium more than twice as long as tibia, with rounded tip, tegulum oval, with long, thin embolus, protruding ventrally from approximately middle surface of tegulum and directed anteriorly, with median expansion, widening tip and enlarged opening (Figs 3H–J, 4D–F).

Female

Unknown.

Distribution

Only known from the type locality in Huila Department (Fig. 6B).

Discussion

Excluding the three misplaced species (*C. pelegrina*, *C. sargi* and *C. longipes*) as proposed by Platnick (1994a), the present study increases the number of known species of *Caponina* to twelve. Platnick (1994a) suggested that *C. pelegrina* and *C. sargi* probably belong to the same genus. However, according to our observations, that may not be the case. The female holotype of *C. sargi* is clearly a Nopinae, based on the excellent illustrations of leg I provided in the original description by Pickard-Cambridge (1899: fig. 6f). This species has several adesmatic joins on the tarsus and metatarsus, which closely resemble the legs of members of *Tarsonops* Chamberlin, 1924, which is the only nopine genus with several adesmatic joins on tarsi and metatarsi (all other nopines have just one or two adesmatic joins). On the other hand, *C. pelegrina* belong clearly to a non-nopine genus. During the original description of this species, Bryant (1940: 272) noted that the female holotype does not have false articulations on tarsi (adesmatic joins) and, unlike *Nops*, it lacks the membranous appendage at the base of the anterior tarsi (the gladius). Thus, both species (*C. sargi* and *C. pelegrina*) actually belong to different, yet undescribed lineages of different subfamilies.

Members of *Caponina* are small-sized, soil-dwelling caponiids. They are very similar in their external appearance, and so far, no pattern of carapace or abdomen coloration has been found, which are common in many other Caponiidae genera; even the size is also homogeneous among species. Also, the differences in palpal morphology across species, however informative, are subtle. Nevertheless,

unlike other caponiid genera, the differences between species can be quite pronounced regarding female internal genitalia. Platnick (1994a) described diagnostic characteristics among females, bringing several informative structures of the internal genitalia to light. Among these structures, Platnick (1994a) highlighted a distinctive pair of sclerotizations arising from the posterior wall of the bursa copulatrix (see Platnick 1994a: figs 22–25). Several different names have been ascribed to those internal sclerotized bars since their discovery. Platnick (1994a) was the first to notice this structure but termed them in three different ways: "distinctive pair of sclerotizations" used in diagnosis of the genus, "internal epigynal sclerotizations" used in figures and diagnosis of species and "pair of almost boomerang-shaped sclerotized bars" used in the description of the genus. Later, Brescovit & Sánchez-Ruiz (2013) used "internal epigynal sclerotizations" to refer to the set of sclerotizations found in the female internal genitalia of *C. papamanga*, including the pair of sclerotized bars, but in the diagnosis of the species they only refer to a single structure (the pair of sclerotized bars). Later, Brescovit & Sánchez-Ruiz (2016) found these internal sclerotized bars in some non-nopine genera and named them as "pair of sclerotized bars" (psb). With the aim of standardizing the nomenclature of this informative structure, which may be homologous across a wide range of Caponiidae genera, we propose to follow Brescovit & Sánchez-Ruiz (2016), even using the same abbreviation. Although the boomerang shape was described for this pair of sclerotized bars, some species don't actually have this shape, as *C. tijuca* and *C. alegre*, which have straight and slightly inclined bars (see Platnick 1994a: figs 23–24). The various shapes of this structure were used in the present paper as diagnostic for both the identification key of all known species and the diagnosis of the new species. Most species in the genus have anterolateral extensions (ae) fused on this structure, except for *C. chilensis*, *C. notabilis* and *C. chinacota*. This structure could act as a receptaculum, but its function is still unknown.

Another internal epyginal structure studied is the sclerotization around spiracles (ess). In *Caponina* this structure is formed by two lateral sclerotizations surrounding the posterior spiracles; in some species, such as *C. cajabamba*, *C. paramo* and *C. tijuca*, both lateral sclerotizations meet in the middle of the abdomen, forming a single sclerotization piece (see Platnick 1994a: figs 23, 33–34). The conformation of this structure (straight, concave or convex) and the shape (narrow or broad) are diagnostic among species and also was used for the identification key and diagnosis in this study.

The examination of the new species herein described allowed establishing primary homologies between these structures on female internal genitalia and those observed in other non-nopine genera of Caponiidae. For example, the pair of sclerotized bars (psb) are also observed in *Tisentnops*, *Nasutonops* and *Carajas* (see Brescovit & Sánchez-Ruiz 2016: figs 3g–l, 4i–j, 11f–i, 12 h–j, 15j–l, 16d), although anterolateral extensions (ae) were not detected in any species of these genera. Similarly, the sclerotization around spiracles (ess) is found in females of non-nopine genera, such as *Caponia*, *Diploglena*, *Iraponia* and *Nasutonops* (Kranz-Baltensperger *et al.* 2009; Haddad 2015; Brescovit & Sánchez-Ruiz 2016). In non-nopines, these sclerotizations are more pronounced in the internal part of the genitalia, as observed in *Caponina* (Figs 1H–I, 2D–E). However, in several nopine genera such as *Cubanops*, *Nops*, *Medionops* Sánchez-Ruiz & Brescovit, 2017 and *Orthonops* Chamberlin, 1924, these sclerotizations are also present, but more pronounced towards the external part of the genitalia (Platnick 1995; Sánchez-Ruiz *et al.* 2010; Sánchez-Ruiz & Brescovit 2017).

Following the detailed study of these genital structures, the new species herein described and the new non-nopine genera recently described by Sánchez-Ruiz & Brescovit (2016), we decided to modify the diagnosis of *Caponina*, adapting it to the new findings. The number of eyes in *Caponina* is one of the characters that easily separates this genus from most of other caponiids, because most of caponiids genera are represented by two-eyed species. Representatives of *Caponina* have between 4 and 6 eyes (with aberrant individuals with 3 or 5 eyes, respectively, as reported by Platnick 1994a). Members of *Caponina* are the only caponiids with a variable number of eyes among its species. With the obvious

exception of blind troglobian caponiids (*Carajas paraua* Brescovit & Sánchez-Ruiz, 2016 and *Tisentnops mineiro* Brescovit & Sánchez-Ruiz, 2016), the number of eyes is constant among species of each genus of Caponiidae other than *Caponina*. Within the family, there are only two other genera with six-eyed species (*Iraponia* and *Nasutonops*) and one four-eyed genus (*Notnops*), which could prove to be the closest relative of *Caponina*.

Also included in this work is a map with the distribution of all 12 known species of *Caponina* (Fig. 6A–B). The genus is composed only of Neotropical species, and half of these species are distributed in the Andes region (Fig. 6A–B). The distribution of *Caponina* is characterized by presenting the highest species richness at the limits of the distribution range of the genus, a pattern that could be explained as an artifact caused by sampling biases. Only two species diverge from this pattern: *C. papamanga* known from the Brazilian Amazonia and *C. cajabamba* from the Andean region of Peru. All other species are restricted to the North and South of the South American continent, including the type species from Saint Vincent Island in the Lesser Antilles (Fig. 6A). The Colombian species, including the new species described here, are all from the Andean region (Fig. 6B). With the present contribution, Colombia is positioned as the territory with the greatest richness of species of *Caponina*, but giving the lack of field-work and the low number of specimens deposited in biological collections, probably many species remain undescribed.

Acknowledgments

We are grateful with Jhon. C. Neita and Carolina Gómez (Instituto Alexander von Humboldt) for having loaned specimens for this study. Instituto Alexander von Humboldt (Colombia) and Universidad del Atlántico (Colombia) allowed the use of their equipment and facilities. Also, we thank the section editor Rudy Jocqué, the desk editor Eva-Maria Levermann and the two anonymous reviewers for their useful suggestions on the manuscript. This paper was supported by Convocatoria para el Fortalecimento de las Instituciones de Educación Superior (Convocatoria 890) from Science Ministry of Colombia to LM, by Programa de Capacitação Institucional (MCTI/MPEG/CNPq 444338/2018-7 process), CNPq grant 300856/2022-9 to ASR, and by CNPq PQ grant 304965/2012-0 to ABB.

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Manuscript received: 12 October 2021
Manuscript accepted: 4 February 2022
Published on: 14 April 2022
Topic editor: Tony Robillard
Section editor: Rudy Jocqué
Desk editor: Eva-Maria Levermann