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Three new *Cybaeodamus* Mello-Leitão, 1938 species from Brazil (Araneae, Zodariidae)

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Abstract. Three new Brazilian species of the zodariid genus *Cybaeodamus* Mello-Leitão, 1938 are described: *C. ampullatus* sp. nov. (♂♀), *C. spinosissimus* sp. nov. (♂) and *C. malkini* sp. nov. (♂). Descriptions are accompanied with high-quality illustrations and microphotographs. An updated distribution map and a key to all the species in the genus are presented. The morphological diagnostic characters of the genus are discussed.

Keywords. Ant-eating spiders, distribution, key to species, South America, taxonomy.

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Introduction

Zodariidae Thorell, 1881 is a diverse group of spiders comprising 1303 species spread across 90 genera (WSC 2025). *Cybaeodamus* Mello-Leitão, 1938 is a zodariid genus that currently contains eight species occurring in South America (WSC 2025). These spiders occupy diverse habitats, ranging from forest to open grasslands (Pett & Wyer 2020) or in arid areas, under stones and logs (Andía & Grismado 2015). As many zodariids, it was observed to hunt ants (Ramírez 2014: 273). Mello-Leitão (1938, 1939, 1941) originally placed *Cybaeodamus* within the Agelenidae C.L. Koch, 1837. The genus was transferred from the Agelenidae to the Zodariidae by Roth (1965). It was studied in the generic revision of Jocqué (1991) where it was placed within the subfamily Storeninae Simon, 1893, even though those spiders are not provided with chisel-shaped metatarsal setae, which was believed to be characteristic of that subfamily (the scopula on the tarsi are actually provided with carpeted setae similar to pseudotenent seta, see Ramírez 2014: fig. 89b–c). Recent phylogenetic studies confirmed its placement within the subfamily Storeninae (Wheeler *et al.* 2017; Henrard 2019). The genus was revised by Lise *et al.* (2009), who recognized seven valid species. Later, after examination of the female holotype, Dankittipakul *et al.*

(2012), transferred *Storena lentiginosa* Simon, 1905 to *Cybaeodamus*, raising the number of species in the genus to eight.

The present contribution introduces three new species to this genus, all occurring in Brazil. Additionally, we place them in a broader context by providing the first key to the species of *Cybaeodamus*, along with a distribution map of the genus.

Material and methods

Specimens were observed and drawn with a WILD M 10 stereo microscope. Photographs of the habitus, details of mouthparts, detached male palps, female genitalia and measurements were taken with a DFC500 camera mounted on a Leica MZ16A and piloted with the Leica Application Suite automontage software (LAS ver. 4.13). Some specimens were photographed after air drying, their habitus probably showing a colour pattern close to their living state. The female epigyne was dissected and digested using half a tablet of Total Care Enzima product (protein removal system originally for cleaning contact lenses and containing subtilisin A–0.4 mg per tablet; Abbott Medical Optics, Santa Ana, CA) in a few millilitres of distilled water overnight, then immersed in 75% ethanol to be photographed (and then stored in a micro vial placed with the body). All measurements are given in millimeters (mm). The cephalic width is anteriorly measured at level of palpal trochanter. Illustrations were assembled and edited in Adobe Photoshop CS5 (adjusted for white balance and colour contrast). The map was produced with ArcGIS ver. 10.3 (Environmental Systems Research Institute – ESRI 2014, Redlands, California).

Remark: the coordinates for the record from Punta de Choros in Chile (Andia & Grismado 2015) appear to be incorrect and should read 29°15′34.1″ S, 71°25′41.9″ W.

Representation of leg spination is inspired by Cazanove *et al.* (2025). Dark circles represent dorsal and lateral spines, whereas white circles represent ventral spines (as if seen dorsally through transparency). Some specimens studied in this work were also included in the phylogenetic analysis by Henrard (2019), from which molecular data were obtained. For these specimens, GenBank accession numbers are provided in the associated metadata.

The material is deposited in the following arachnological collections (curator):

AMNH = American Museum of Natural History, New York, USA (L. Prendini)
CHNUFPI = Coleção de História Natural of the Universidade Federal do Piauí, Floriano, Brazil (J.F. Vilela)
IBSP = Instituto Butantan, São Paulo, Brazil (A.D. Brescovit)
MPEG = Museu Paraense Emílio Goeldi, Belém, Brazil (A.B. Bonaldo)
UFMG = Centro de Coleções Taxonômicas of the Universidade Federal de Minas Gerais, Belo Horizonte, Brazil (A.J. Santos)

Abbreviations

A = anterior arches of epigyne
ALE = anterior lateral eyes
AME = anterior median eyes
CAP = conductor anterior prong
CD = copulatory duct
CMP = conductor median process
CO = copulatory opening
CPP = conductor posterior prong
DE = dorsal extension of RTA

E = embolus
EBP = embolus basal process
FD = fertilisation duct
Fe = femur
MA = median apophysis
Mt = metatarsus
P = patella
PFC = probasal flange of cymbium
PLE = posterior lateral eyes
PME = posterior median eyes
RFC = retrobasal fledge of cymbium
RTA = palpal retrolateral tibial apophysis
S = spemathecae
St = subtegulum
t = tars
TA = additional tegula apophysis
Ti = tibia
VE = ventral extension of RTA
VP = ventral process of palpal tibia

Results

Taxonomy

Class Arachnida Cuvier, 1812
Order Araneae Clerck, 1757
Family Zodariidae Thorell, 1881

Genus ***Cybaeodamus*** Mello-Leitão, 1938

Hyltoniella Mello-Leitão, 1940 – Jocqué 1991: 49 (in synonymy).
Valcheta Mello-Leitão, 1940 – Jocqué 1991: 49 (in synonymy).

Type species

Cybaeodamus ornatus Mello-Leitão, 1938; gender masculine.

Diagnosis

Cybaeodamus can be recognized by the combination of following characters: both sexes have the chelicerae densely covered with setae (Fig. 14G), and the coxae IV are positioned close to each other, sometimes touching in males (Figs 1B–C, 7C, 10B, 14C, I). Additionally, males are recognized by having at least two tegular apophyses – a median apophysis and a terminal, sclerotized conductor-like appendage – and are further characterized by a field of densely packed modified setae on the venter of the abdomen (Figs 3B–F, 10K–L, 14C–H; see also Lise *et al.* 2009: figs 13–14, 35; and Andía & Grismado 2015: fig. 4b–c). Females are distinguished by the epigyne with strongly sclerotized areas on both sides and anteriorly delimited by deep arches (Figs 6C, 9A–C).

Description

See Jocqué (1991).

Distribution

South America: Argentina, Brazil, Chile, Paraguay, Peru, Uruguay.

Key to species

Males

Remarks: the male of *Cybaeodamus lentiginosus* (Simon, 1905) is unknown.

1. Conductor with three extensions (Figs 5–6; Lise *et al.* 2009: figs 2, 29–30, 45; Andía & Grismado 2015: fig. 3a); MA long, transverse, originating centrally (Figs 5–6; Lise *et al.* 2009: figs 2–3, 22, 29–30, 42, 45) 2
– Conductor claw-shaped or folded (Figs 12B, D–E; Lise *et al.* 2009: figs 37, 63–54); MA sickle- or axe-shaped, originating retrolateral of centre (Figs 12B–E; Lise *et al.* 2009: figs 37, 39, 65) 7

2. Embolus origin retrobasal (Figs 5B–E, 6A; Lise *et al.* 2009: fig. 45); subtegulum situated centrobasally (Figs 5D–E, 6A; Lise *et al.* 2009: fig. 45) 3
– Embolus origin probasal (Lise *et al.* 2009: figs 29, 50, 54); subtegulum placed retrobasally (Lise *et al.* 2009: figs 29, 50, 54) 4

3. Chelicerae with one tooth on promargin only (Fig. 3A); abdomen venter with patch of modified, ampullate setae (Fig. 3B–F); RTA with long superior prong (longer than wide) provided with notched tip (Figs 5B–C, 6B) ..... ***Cybaeodamus ampullatus*** sp. nov.
– Chelicerae with two teeth on promargin and one tooth on retromargin; abdomen venter with patch of needle-like setae (Lise *et al.* 2009: figs 46–47); RTA with shorter prong (as wide as long) provided with two sharp apical extensions (Lise *et al.* 2009: fig. 44) ..... ***Cybaeodamus enigmaticus*** (Mello-Leitão, 1939)

4. Sternum with deep lateral depressions (Lise *et al.* 2009: fig. 25); coxae III–IV with basoventral tubercles (Lise *et al.* 2009: fig. 25); RTA with ventro-subapical hook-shaped extension (Lise *et al.* 2009: fig. 24) ..... ***Cybaeodamus taim*** Lise, Ott & Rodrigues, 2009
– Sternum and coxae unmodified; RTA without subapical extension 5

5. Abdomen venter with patch of serrate setae (Lise *et al.* 2009: figs 13–14); RTA with overlapping lamellate extensions (Lise *et al.* 2009: fig. 3) ..... ***Cybaeodamus meridionalis*** Lise, Ott & Rodrigues, 2009
– Abdomen venter with patch of granulate setae (Lise *et al.* 2009: fig. 58; Andía & Grismado 2015: fig. 4b–c); RTA with two sharp apical extensions (Lise *et al.* 2009: fig. 51; Andía & Grismado 2015: figs 3d, 4a) 6

6. Conductor with ventral processes (CAP and CMP) similar in size and both pointed (Andía & Grismado 2015: fig. 3a, c); RTA with tiny dorsal tooth (Andía & Grismado 2015: fig. 4a) ..... ***Cybaeodamus lycosoides*** (Nicolet, 1849)
– Conductor with anterior prong (CAP) much longer than median process (CMP), the latter rounded (Lise *et al.* 2009: figs 50, 54); RTA without additional tooth ..... ***Cybaeodamus ornatus*** Mello-Leitão, 1938

7. Conductor with large fold accommodating the embolus (Figs 16D, 17A, D–E; Lise *et al.* 2009: figs 63–64); embolus originating pro-anteriorly (Figs 16D, 17A, D–E; Lise *et al.* 2009: figs 63–64); MA sickle-shaped with sharp apex (Figs 16E, 17B; Lise *et al.* 2009: figs 63, 65); subtegulum visible as prolateral knob (Figs 16A–B, D, 17A, D–E; Lise *et al.* 2009: figs 63–64) 8
– Conductor claw-shaped, with small apical groove accommodating the embolus (Figs 12B, D–E, 13B; Lise *et al.* 2009: fig. 37); embolus originating probasally (Figs 12A–B, D, 13B; Lise *et al.* 2009: figs 37–38); MA axe-shaped, with hook-shaped or blunt tip (Figs 12B–E, 13A–B; Lise *et al.* 2009: figs 37, 39); subtegulum visible probasally (Figs 12A–B, D, 13A–B; Lise *et al.* 2009: fig. 37) 9

8. Abdominal venter with patch of small, thick, spine-shaped setae (Fig. 14H); coxae and femora III unmodified; palp with additional tegular apophysis (TA) situated centrally (Figs 16D, 17A, D–E) .... ***Cybaeodamus malkini*** sp. nov.
– Abdominal venter with patch of long, needle-like setae; coxae III ventrally with faint apical tubercle (Lise *et al.* 2009: fig. 61); femora III with basoventral process (Lise *et al.* 2009: fig. 62); palp without additional tegular apophysis .....***Cybaeodamus tocantins*** Lise, Ott & Rodrigues, 2009

9. Abdominal venter with patch of short spine-shaped setae (Fig. 10K–L); cheliceral promargin with two teeth (Fig. 10E–F); coxae IV with retrolateral brush of strong macrosetae (Fig. 10J) .... ***Cybaeodamus spinosissimus*** sp. nov.
– Abdominal venter with patch of curved spatulated setae; cheliceral promargin without teeth; coxae IV without brush of strong macrosetae ..... ***Cybaeodamus brescoviti*** Lise, Ott & Rodrigues, 2009

Females

Remarks: the females of *Cybaeodamus enigmaticus* and *Cybaeodamus lentiginosus* are not included due to insufficient available information in the literature. The females of *Cybaeodamus malkini* sp. nov. and *Cybaeodamus spinosissimus* sp. nov. are unknown.

1. Epigyne shape narrower at the base, heart- or bulb-shaped, anterior arches connected medially (Figs 6C, 9A–C; Lise *et al.* 2009: fig. 40) 2
– Epigyne shape roughly rounded or rectangular, anterior arches not touching (Lise *et al.* 2009: figs 6, 27, 48, 52, 66) 3

2. Copulatory ducts long, running anterior to spermathecae, strongly enlarged and flattened, forming overlapping loops (Fig. 9D–F) .....***Cybaeodamus ampullatus*** sp. nov.
– Copulatory ducts short and cylindrical, situated between spermathecae, converging anteriorly, basally close to each other but not overlapping (Lise *et al.* 2009: fig. 41) .... ***Cybaeodamus brescoviti*** Lise, Ott & Rodrigues, 2009

3. Epigyne shape roughly rectangular, longer than wide, without protrusions (Lise *et al.* 2009: fig. 66) .....***Cybaeodamus tocantins*** Lise, Ott & Rodrigues, 2009
– Epigyne shape roughly rounded, as long as wide, with anterior or lateral protrusions (Lise *et al.* 2009: figs 6, 9, 27, 33, 52, 55–56) 4

4. Copulatory ducts short, C- or n-shaped (Lise *et al.* 2009: figs 7, 10, 49) 5
– Copulatory ducts longer; sinuous (Lise *et al.* 2009: figs 28, 34, 53, 57) 6

5. Copulatory ducts running anterior to spermathecae, far apart (Lise *et al.* 2009: figs 7, 10) .... ***Cybaeodamus meridionalis*** Lise, Ott & Rodrigues, 2009
– Copulatory ducts situated between spermathecae, close to each other (Lise *et al.* 2009: fig. 49) .... ***Cybaeodamus lycosoides*** (Nicolet, 1849)

6. Epigynal plate laterally protruding (Lise *et al.* 2009: figs 27, 33), duct S-shaped with basomedial part close to each other (Lise *et al.* 2009: figs 28, 34) .... ***Cybaeodamus taim*** Lise, Ott & Rodrigues, 2009
– Epigynal plate anterolaterally protruding (Lise *et al.* 2009: figs 52, 55–56), copulatroy duct less sinuous, basomedial part far apart from each other (Lise *et al.* 2009: figs 53, 57) ....***Cybaeodamus ornatus*** Mello-Leitão, 1938

Species descriptions

Cybaeodamus ampullatus sp. nov.
urn:lsid:zoobank.org:act:81FA5592-AC1D-4276-B945-2D349A65FAA6
Figs 1–9

Diagnosis

Males of the new species are similar to those of *Cybaeodamus enigmaticus*. They differ from other congeners by the retrobasal origin of the embolus base and a similar shape of the tegular apophysis and conductor (Figs 5D–E, 6A vs Lise *et al.* 2009: figs 42, 45). However, males of *C. ampullatus* sp. nov. are distinguished by the shape of the elongate prong of the RTA (Figs 5B–C, 6B vs different shape and shorter, see Lise *et al.* 2009: fig. 44), the presence of one tooth on the cheliceral promargin only (Fig. 3A vs two teeth on promargin and one tooth on the retromargin, Mello-Leitão 1939: 58) and the field of modified, ampullate setae on the abdomen venter (Fig. 3C–F vs ventral cover with needle-like setae, see Lise *et al.* 2009: figs 46–47; see also Jocqué 1991: 50). The female is recognized by a bulb-shaped epigynal plate (Figs 6C, 9A–C), and the strongly enlarged, overlapping, flatworm-shaped copulatory ducts (Fig. 9D–F).

Etymology

In Latin, '*ampullatus*' means 'flask-shaped' or 'ampulla'. The specific epithet is an adjective and refers to the dense patch of ampullate setae on venter of the male's abdomen.

Material examined

Holotype

BRAZIL • ♂; Piauí, Alvorada do Gurguéia, Fazenda Escola da Universidade Federal do Piauí; 8°22′28″ S, 43°51′32″ W; 15–17 Feb. 2012; L.S. Carvalho leg.; arbustive Caatinga; DNA voucher specimen: DNA Z267; GenBank accession numbers: KY007994 (COI), KY008101 (H3); CHNUFPI 9167.

Paratypes

BRAZIL • 1 ♂, 1 ♀; same data as for holotype; CHNUFPI 0592 • 1 ♂; same data as for holotype; CHNUFPI 0590 • 2 ♂♂; same locality as for holotype; I.L.F. Magalhães *et al.*; IBSP 221107 • 1 ♂; same data as for holotype; IBSP 221108 • 1 ♂; Coronel José Dias, Parque Nacional da Serra da Capivara, near Boqueirão do Ferreira; 8°44′51.2″ S, 42°29′13.1″ W; 584 m a.s.l.; 9 Dec. 2019; L.S. Carvalho *et al.* leg.; CHNUFPI 7528.

Other material

BRAZIL – **Ceará** • 1 ♀; Crato, Floresta Nacional de Araripe, Picoto trail; 7°20′42.8″ S, 39°25′5.2″ W; 6 Feb. 2011; A.S. Lopes leg.; Cerradão; CHNUFPI 2460. – **Pernambuco** • 1 ♂; Itacuruba, near Riacho Itacuruba; 8°47′14.8″ S, 38°41′53.7″ W; 309 m a.s.l.; 2014; S.C. Sousa leg.; CHNUFPI 2462. – **Piauí** • 3 ♂♂, 4 ♀♀; Guaribas, Parque Nacional da Serra das Confusões; 9°13′32.4″ S, 43°27′46.9″ W; 721 m a.s.l.; 9–15 Dec. 2010; L.S. Carvalho *et al.* leg.; CHNUFPI 2463 • 1 ♂; same data as for preceding; CHNUFPI 2464 • 1 ♂; same data as for preceding; CHNUFPI 2466 • 1 ♂; same data as for preceding; CHNUFPI 2467 • 1 ♂; same data as for preceding; F.S. Silva leg.; CHNUFPI 2465 • 1 ♀; same data for preceding; L.S. Carvalho leg.; MPEG 35508 • 1 ♀; same data as for preceding; MPEG 35511 • 2 ♂♂; same data as for preceding; UFMG 23389.

Description

Male holotype (Figs 1–5, 6A–B; except as otherwise indicated)

Body measurements. Total length 8.78; carapace 4.72 long, 3.01 wide, narrowed to 2.05 in front, 1.50 high.

Colour in ethanol (Figs 1A–E, 3A–B). Carapace orange-brown with two large, longitudinal brown bands, darker anteriorly, anterior half medially with narrow brown band reaching eyes and interrupted before reaching brown fovea, lateral margins with narrow dark brown band; eyes ringed with black, all dark except PME provided with half median bright tapetum; chelicerae brown, paler ventromedially,

Fig. 1. *Cybaeodamus ampullatus* sp. nov. **A–E**. Holotype, ♂ (CHNUFPI 9167). **F–J**. Paratype, ♂ (CHNUFPI 0590). **A, F**. Habitus, dorsal view. **B, G**. Idem, ventral view. **C**. Sternum, ventral view. **D, H**. Habitus, lateral view. **E, I**. Eye area, antero-dorsal view. **J**. Idem, dorsal view. Scale bars: A–B, D, F–H = 2 mm; C = 1 mm; E, I–J = 0.5 mm.

Table 1. Leg measurements of *Cybaeodamus ampullatus* sp. nov., holotype, ♂ (CHNUFPI 9167).

	Fe	P	Ti	Mt	t	Total
I	2.81	1.27	2.18	2.21	1.84	10.31
II	2.61	1.26	1.26	2.00	1.61	8.74
III	2.70	1.30	1.73	2.54	1.62	9.89
IV	3.22	1.46	2.42	3.79	1.89	12.78

labium orange-brow, endites yellow-brown, distally paler; sternum orange-brown, paler towards centre; legs and palps pale orange-yellow, with femora darker, medium brown; abdomen dorsum dark grey mottled with tiny pale cream dots, with white inverted V-shaped mark anteriorly and few faint chevrons in posterior half, venter pale cream, area posterior to epigastric slit with three longitudinal, blackish bands; spinnerets yellow.

Colour when dried (Figs 1F–J, 3D–G; paratypes CHNUFPI 0590, 0592). Much more contrasted, carapace area reddish-brown with band pattern black; chelicerae and labium black, endites reddish-brown; sternum dark reddish-brown; legs and palps reddish-brown, with femora black; abdomen as preceding; spinnerets orange-brown. Remark: the coloration of dry specimens appears to closely resemble the natural coloration of live specimens (see Fig. 2, male paratype CHNUFPI 7528).

Carapace (Fig. 1A, D; paratype CHNUFPI 0590, Fig. 1F, H). Oval, with anterior constriction at palp trochanter level, cephalic portion slightly elongate, fovea as a narrow longitudinal slit; profile slightly doomed, highest point in front of fovea, with slight depression at level of fovea; cover of numerous thin silvery setae.

Eye sizes and interdistances. AME: 0.19; ALE: 0.17; PME: 0.15: PLE: 0.18; AME–AME: 0.05; AME–ALE: 0.03; AME–PME: 0.14; AME–PLE: 0.21; ALE–ALE: 0.44; ALE–PLE: 0.10; ALE–PME: 0.28; PME–PME: 0.09; PME–PLE: 0.21. MOQ: frontal width 0.43, posterior width 0.39, length 0.48.

Clypeus. 0.56 high, provided with group of thick setae (Fig. 1E; paratype CHNUFPI 0590, Fig. 1I). Chilum single, narrow. Chelicerae 1.49 long, densely covered with thick setae, promargin with one tooth, retromargin without (Fig. 3A).

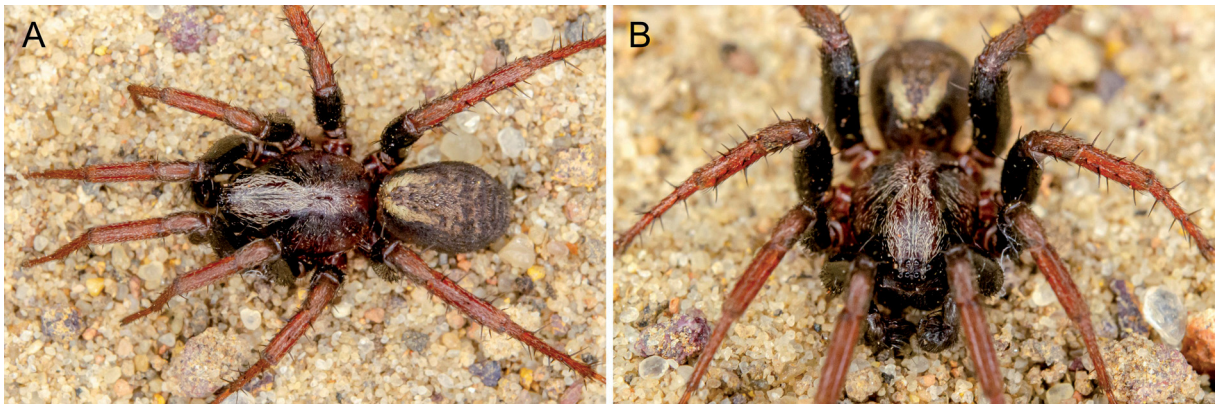

Fig. 2. *Cybaeodamus ampullatus* sp. nov., paratype, ♂ (CHNUFPI 7528), habitus in life. **A**. Dorsal view. **B**. Frontal view.

Sternum (Fig. 1C). Elongate oval, 1.28 long, 0.92 wide, with slightly sinuous margins, uniformly covered with fine setae.

Fig. 3. *Cybaeodamus ampullatus* sp. nov. **A–C**. Holotype, ♂ (CHNUFPI 9167). **D, F–G**. Paratype, ♂ (CHNUFPI 0590). **E**. Paratype, ♂ (CHNUFPI 0592). **A**. Chelicerae, ventral view. **B, D**. Abdomen, ventral view. **C, F**. Idem, detail on field of ampullate spines. **E**. Epiandrum, ventral view. **G**. Spinnerets, ventral view. Scale bars: A, E = 0.5 mm; B, D = 1 mm; C, F–G = 0.2 mm.

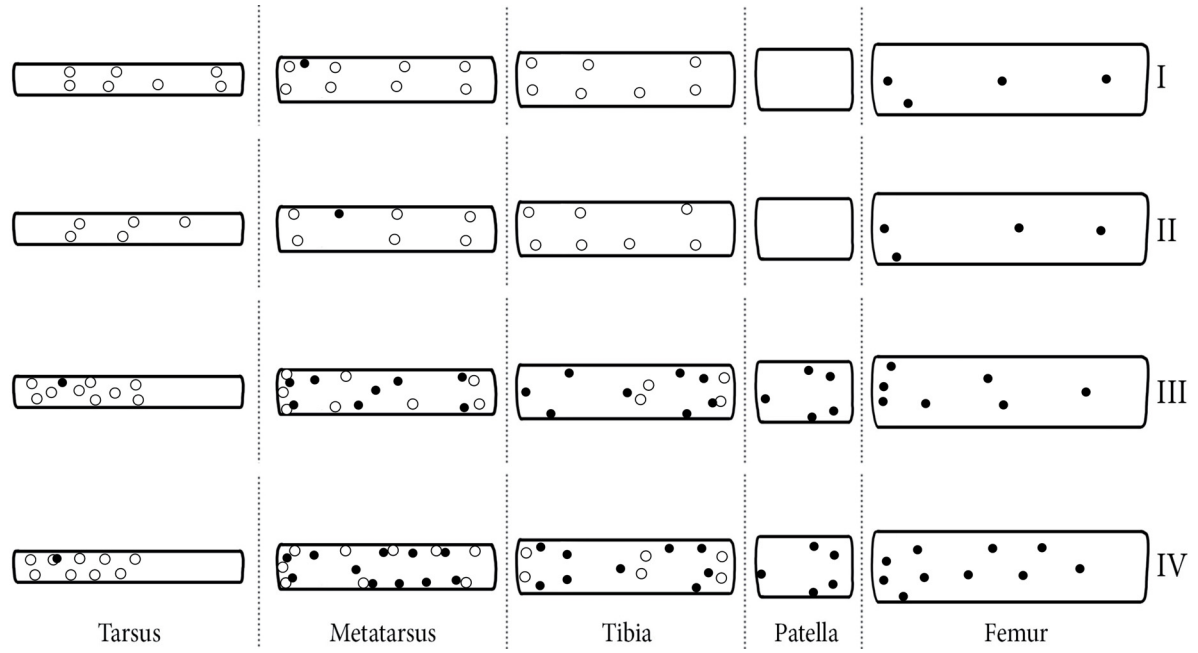

Fig. 4. *Cybaeodamus ampullatus* sp. nov., holotype, ♂ (CHNUFPI 9167), spination. Dark circles represent dorsal and lateral spines, whereas white circles represent ventral spines (as if seen dorsally through transparency).

Legs. Densely covered with fine setae; leg formula 4132 (Table 1). Leg spination as in Fig. 3.

Abdomen (Figs 1A–B, 3B; paratypes CHNUFPI 0590, 0592, Figs 1F–G, 3D–E). Oval, 4.04 long and 2.54 wide, covered with numerous short, black setae, posterior half of venter medially with large dense patch of small ampullate setae (Fig. 3C; paratype CHNUFPI 0590, Fig. 3F); spinnerets with narrow subdistal ring (Fig. 3B; paratype CHNUFPI 0590, Fig. 3G).

Palp (Figs 5–6). Femur 1.65 long; tibia provided prolaterally with group of long curved setae; RTA long, slightly curved, with distal tip notched and subdistally with small ventral groove, base large and provided with ventral process (VP) accommodating retrobasal fledge (RFC) of cymbium; cymbium ovoid with pointed tip, anterior half dorsally with thick patch of short, light setae, retrobasally with thin fledge, with four spines prolaterally, two spines retrolaterally and with two dorsal spines subapically; tegulum with median apophysis (MA) originating centrally, roughly transverse, directed obliquely retrolaterad, narrow basally, inflated medially and tapered dorsoanteriorly, conductor complex, with three process: one anterior, long, sharp, slightly curved prong (CAP) with ventral groove accommodating embolus, its dorsal margin slightly serrated, one median, small crest-like process (CMP), and one posterior, transverse, tongue-shaped process (CPP) partially hidden by MA; subtegulum (St) large, rounded, centrobasal, partly hidden under tegulum; embolus (E) whip like, with basal membranous process (EBP), originating retrobasally and turning around prolaterally.

Female paratype (CHNUFPI 0592; Figs 7–9; as in male except as noted)
Body measurements. Total length 9.42; carapace 4.48 long, 2.40 wide, narrowed to 1.96 in front, 1.88 high.

Colour in ethanol (Fig. 7A). Carapace area brown with only two large, longitudinal dark brown bands; fovea faintly marked; abdomen dorsum grey with faint white inverted V-shaped mark anteriorly, venter uniformly pale grey; spinnerets yellowish-brown.

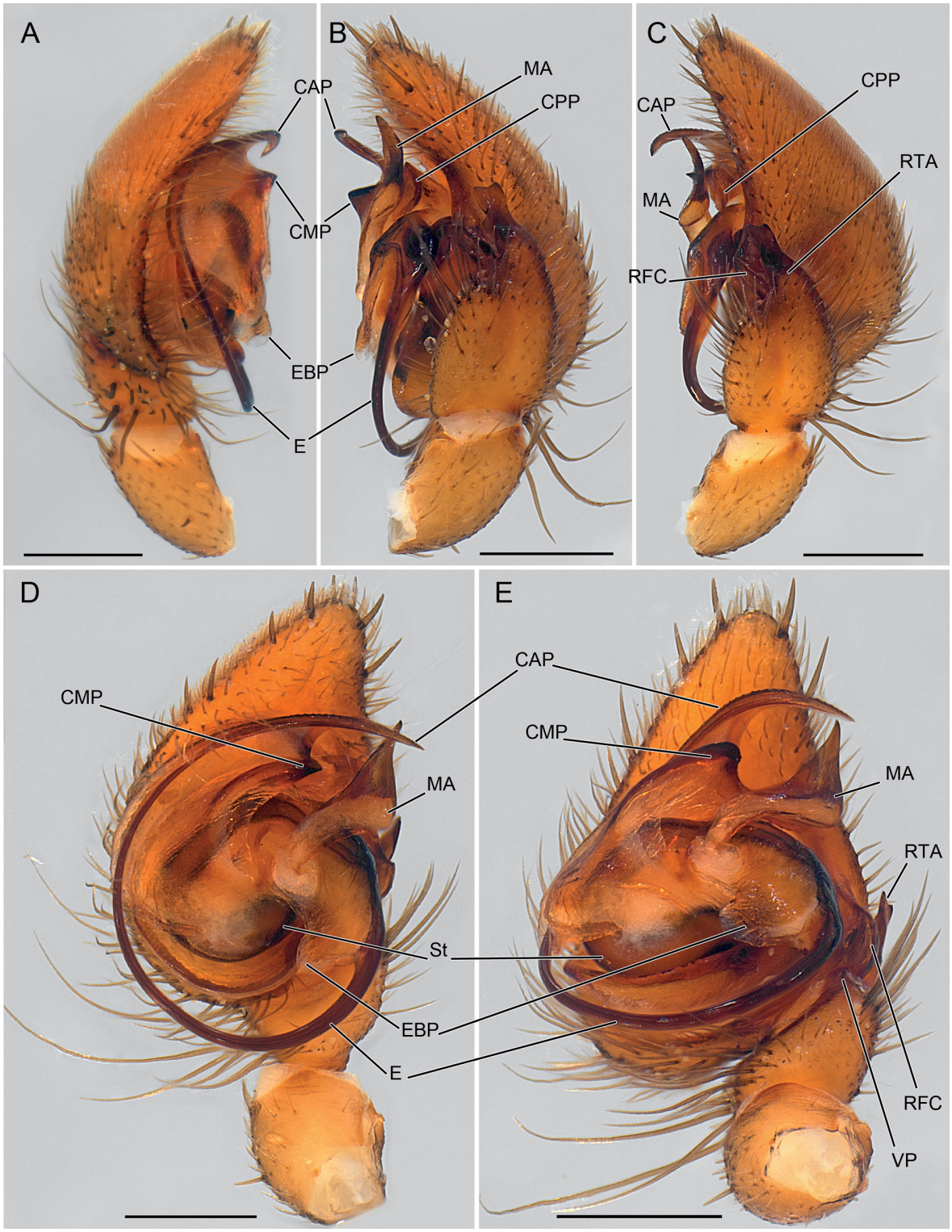

Fig. 5. *Cybaeodamus ampullatus* sp. nov., holotype, ♂ (CHNUFPI 9167), right palp (mirrored views). **A**. Prolateral view. **B**. Retrolateral view. **C**. Idem, slightly dorsal view. **D**. Ventral view. **E**. Idem, slightly posterior view. Abbreviations: CAP = conductor anterior prong; CMP = conductor median process; CPP = conductor posterior prong; E = embolus; EBP = embolus basal process; MA = median apophysis; RFC = retrobasal flange of cymbium; RTA = palpal retrolateral tibial apophysis; St = subtegulum; VP = tibial ventral process. Scale bars = 0.5 mm.

Colour when dried (Fig. 7B–D). Similar as previous except abdomen entirely pale cream.

Carapace (Fig. 7). Elongate, oblong; profile doomed in cephalic area and sloping forward posteriorly.

Eye (Fig. 7E). Sizes and interdistances: AME: 0.16; ALE: 0.14; PME: 0.13: PLE: 0.15; AME–AME: 0.07; AME–ALE: 0.06; AME–PME: 0.14; AME–PLE: 0.20; ALE–ALE: 0.40; ALE–PLE: 0.13; ALE–PME: 0.28; PME–PME: 0.08; PME–PLE: 0.18. MOQ: frontal width 0.39, posterior width 0.34, length 0.43.

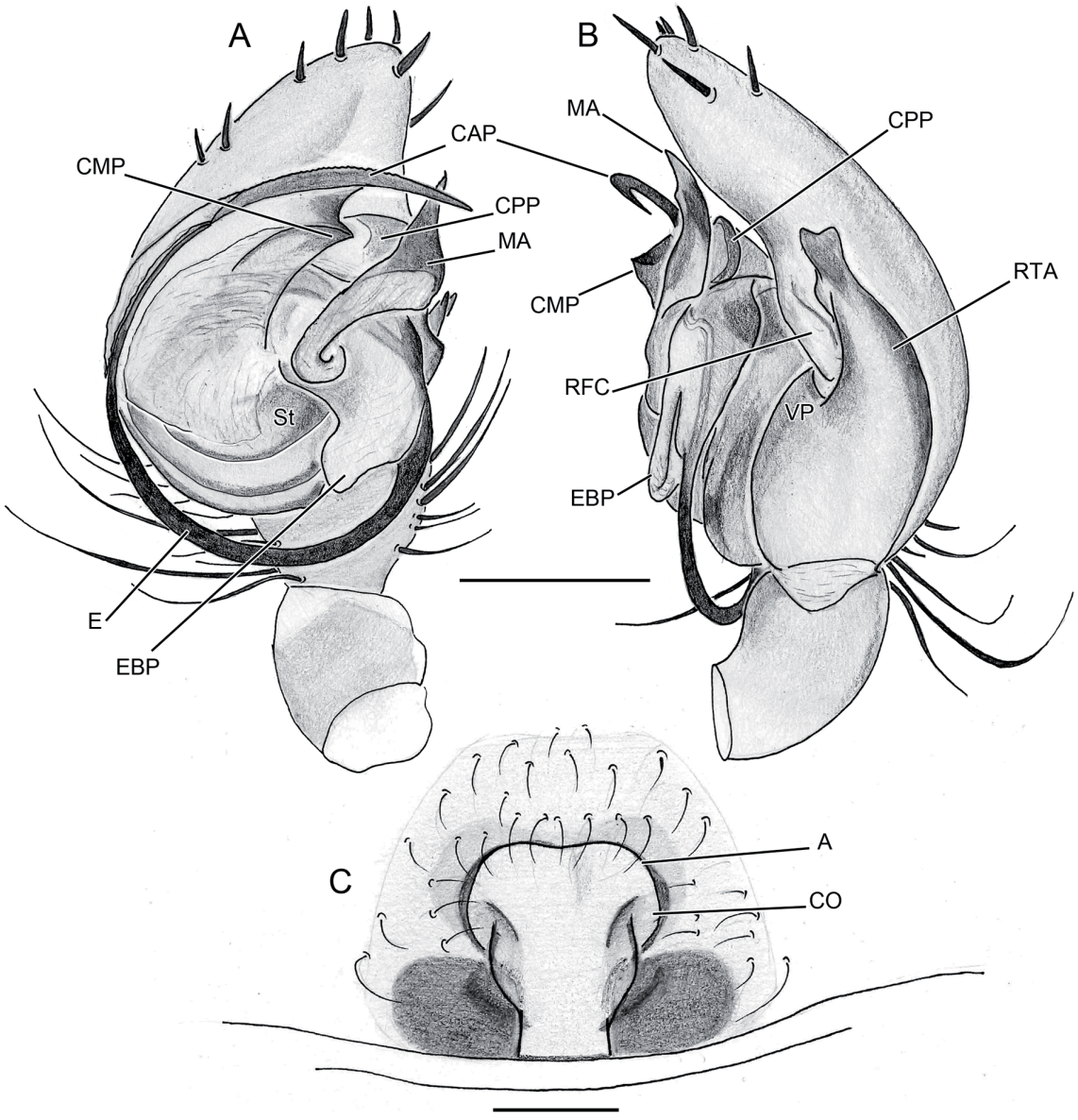

Fig. 6. *Cybaeodamus ampullatus* sp. nov., genitalia drawings. **A–B**. Holotype, ♂ (CHNUFPI 9167). **A**. Right palp, ventral view (mirrored). **B**. Idem, retrolateral view (mirrored). **C**. Paratype, ♀ (CHNUFPI 0592), epigyne, ventral view. Abbreviations: A = anterior arches of epigyne; CAP = conductor anterior prong; CMP = conductor median process; CO = copulatory opening; CPP = conductor posterior prong; E = embolus; EBP = embolus basal process; MA = median apophysis; RFC = retrobasal flange of cymbium; RTA = palpal retrolateral tibial apophysis; St = subtegulum; VP = tibial ventral process. Scale bars = 0.5 mm.

Sternum (Fig. 7C). 1.84 long and 1.49 wide, oval.

Legs. Densely covered with fine setae; leg formula 4123 (Table 2). Leg spination as in Fig. 8.

Abdomen (Fig. 7A–D). Oval, 4.62 long, 3.00 wide, venter with two faintly sclerotized patch anterolaterally corresponding to book lung covers.

Epigyne (Fig. 9A–C). Epigynal plate narrowed basally, enlarged anteriorly, bulb-shaped, overlooked by large anterolateral arches, connected medially; copulatory openings (CO) large oval, situated mediolaterally; vulva (Fig. 9D–F) with large, flattened, flatworm-shaped copulatory duct (CD), with one coil; spermathecae (S) rounded oval; fertilisation ducts (FD) flat, curved upward.

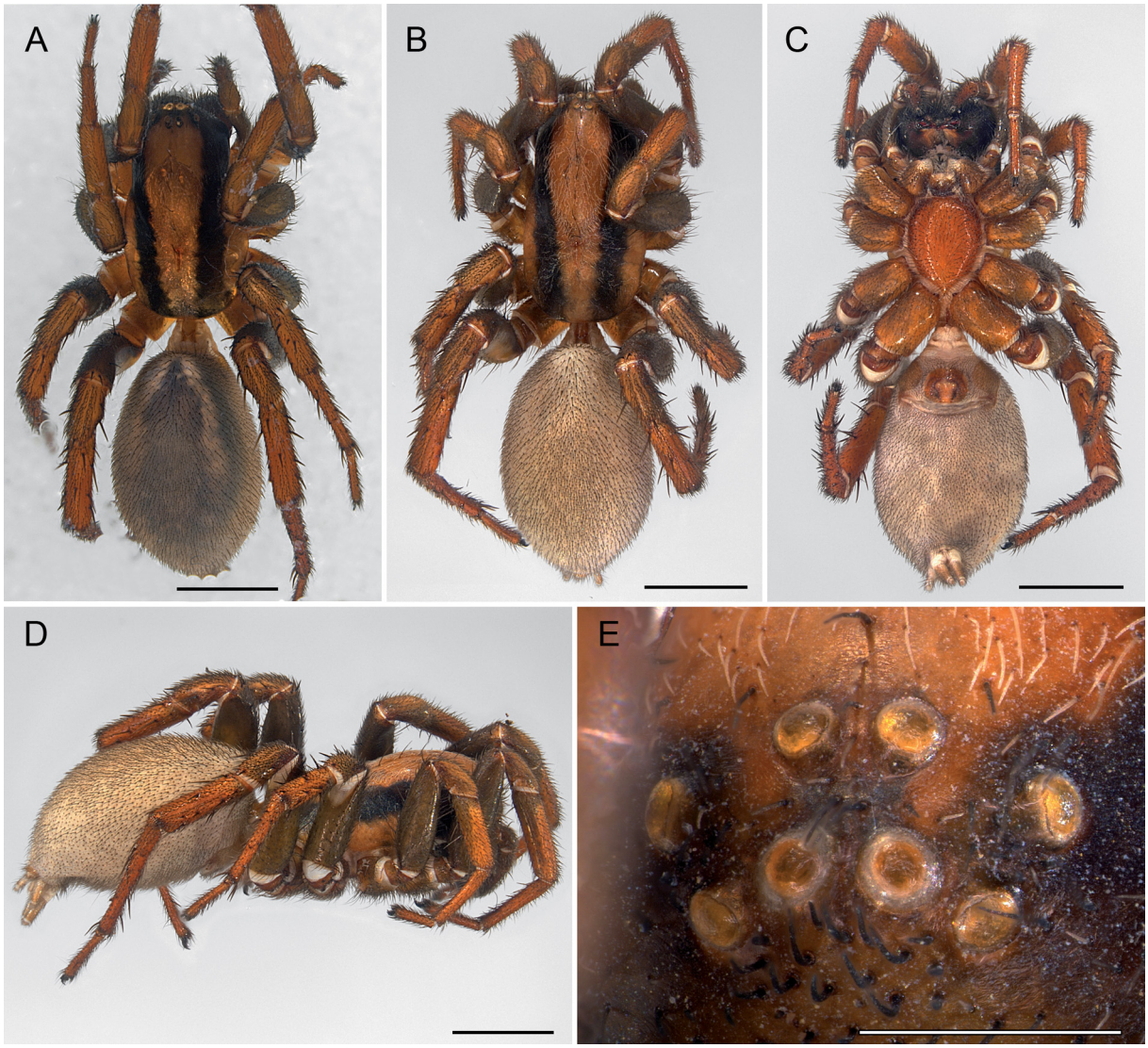

Fig. 7. *Cybaeodamus ampullatus* sp. nov., paratype, ♀ (CHNUFPI 0592). **A**. Habitus in alcohol, dorsal view. **B**. Idem, dried. **C**. Idem, ventral view. **D**. Idem, lateral view. **E**. Eye area, frontal view. Scale bars: A–D = 2 mm; E = 0.5 mm.

Table 2. Leg measurements of *Cybaeodamus ampullatus* sp. nov., paratype, ♀ (CHNUFPI 0592).

	Fe	P	Ti	Mt	t	Total
I	2.69	1.12	1.82	1.74	1.44	8.81
II	2.21	1.60	1.47	1.53	1.05	7.86
III	2.16	1.11	1.37	1.9	1.24	7.78
IV	2.45	1.35	1.98	2.52	1.26	9.56

Variation

Males (n = 2), body measurements: total length 7.52–8.20; carapace length 4.22–4.58, width 2.40–2.87, narrowed to 1.87–1.98 in front, height 1.42–1.49; abdomen length 3.34–3.54, width 2.37–2.51; sternum length 1.84–2.05, width 1.49–1.54.

Distribution

The species is known only from Ceará, Piauí and Pernambuco states, in northeastern Brazil (Fig. 18).

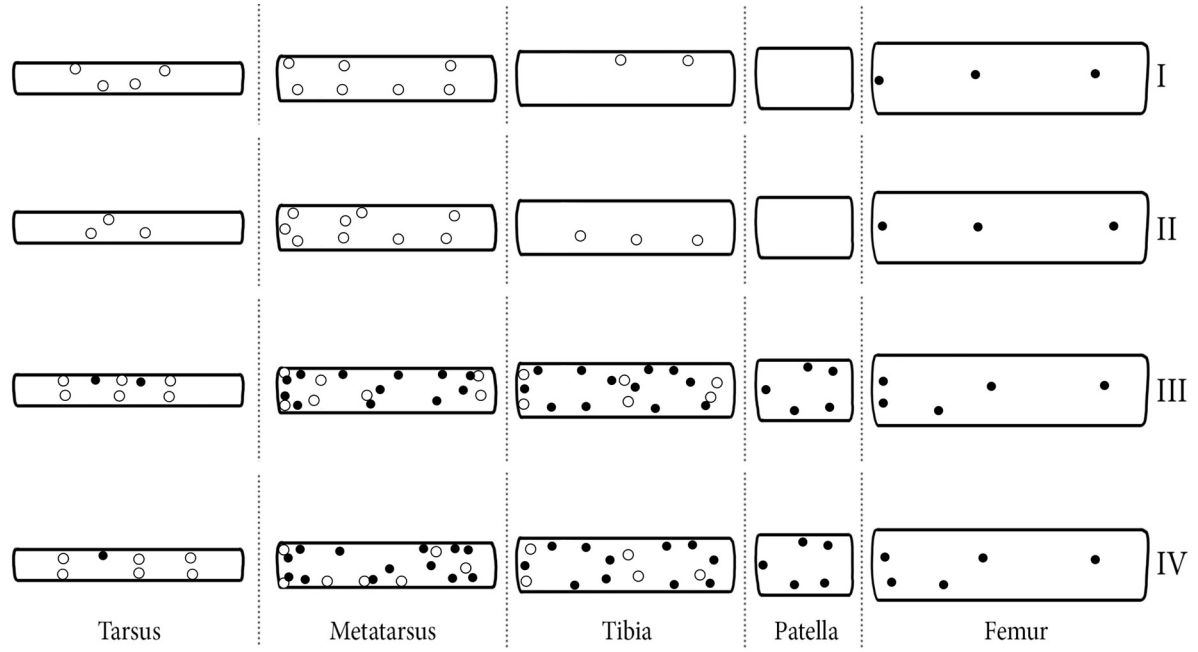

Fig. 8. *Cybaeodamus ampullatus* sp. nov., paratype, ♀ (CHNUFPI 0592), spination. Dark circles represent dorsal and lateral spines, whereas white circles represent ventral spines (as if seen dorsally through transparency).

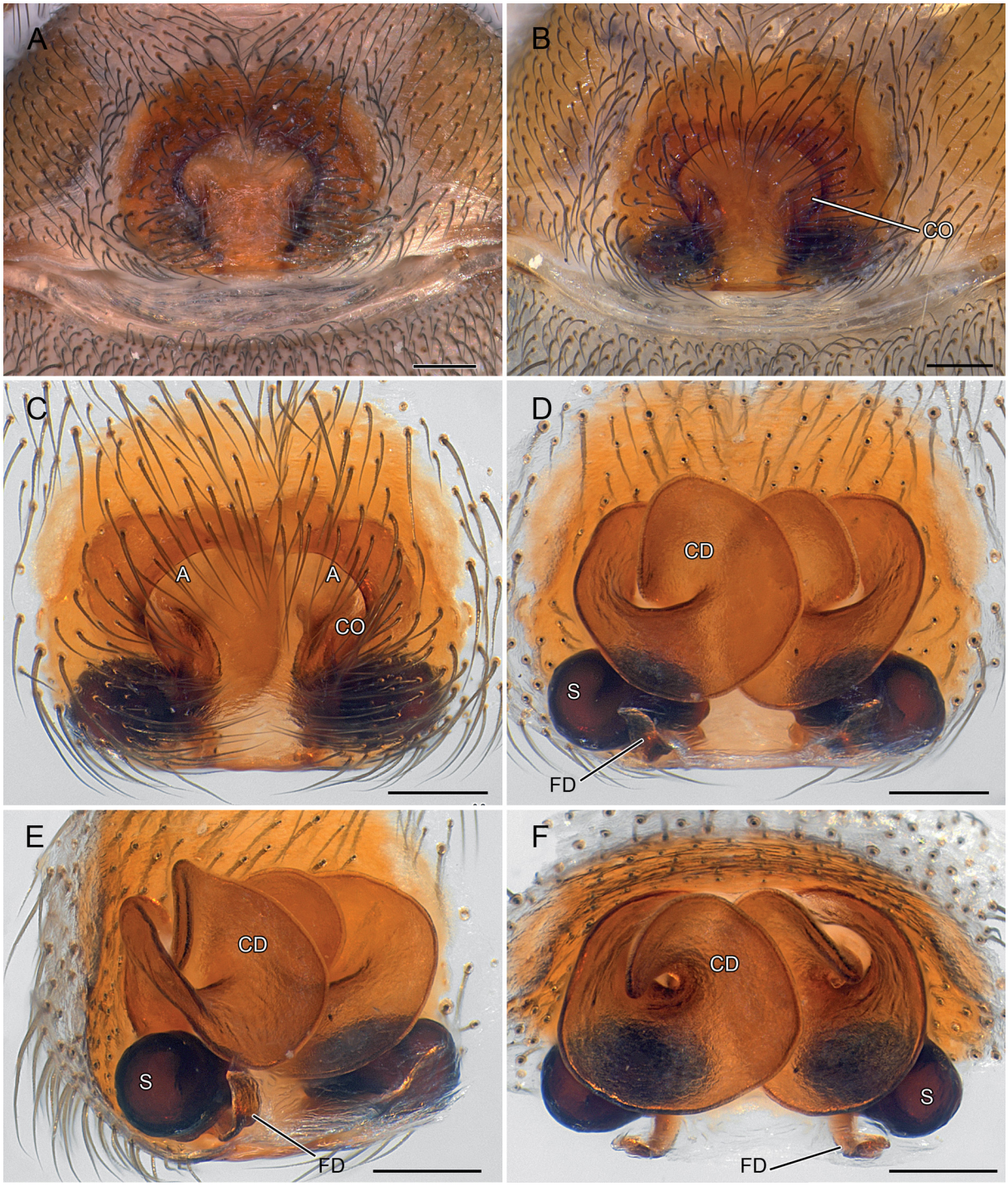

Fig. 9. *Cybaeodamus ampullatus* sp. nov., paratype, ♀ (CHNUFPI 0592), genitalia. **A**. Epigyne, specimen dry, ventral view. **B**. Idem, in alcohol. **C**. Epigyne cleared, ventral view. **D**. Idem, endogyne, dorsal view. **E**. Idem, dorso-lateral view. **F**. Idem, dorso-anterior view. Abbreviations: A = anterior arches of epigyne; CD = copulatory duct; CO = copulatory opening; F = fertilisation duct; S = spermathecae. Scale bars = 0.2 mm.

Cybaeodamus spinosissimus sp. nov.
urn:lsid:zoobank.org:act:835B2369-137E-44B7-BD34-3E108E65D52A
Figs 10–13

Diagnosis

The male of the new species shares a similar palp conformation with that of *Cybaeodamus brescoviti* (Figs 12–13 vs Lise *et al.* 2009: figs 37–39). Both species share a simple, claw-shaped conductor and a median apophysis roughly axe-shaped differing from all other congeners. However, the palp of *C. spinosissimus* sp. nov. has a differently shaped median apophysis (MA) (Figs 12E, 13A–B vs Lise *et al.* 2009: figs 37, 39). It can further be distinguished by the shape of the modified setae tightly grouped on the venter of the abdomen, which are spine-shaped (Fig. 10K–L vs curved spatulated setae, see Lise *et al.* 2009: 266), the fourth coxae with a brush of strong macrosetae (Fig. 10B, J vs absent) and the promargin of the chelicerae provided with two teeth (Fig. 10E–F vs absent).

Etymology

The term '*spinosissimus*' is derived from the Latin word '*spinosus*' and means 'very spiny'. The specific epithet is an adjective and refers to the dense patch of short spine-like setae on the abdomen venter.

Material examined

Holotype

BRAZIL • ♂; Piauí, Alvorada do Gurguéia, Fazenda Escola da Universidade Federal do Piauí; 8°22′28″ S, 43°51′32″ W; 15–17 Feb. 2012; L.S. Carvalho leg.; arbustive Caatinga; DNA voucher specimen: DNA Z266; GenBank accession numbers: KY007993 (COI), KY008100 (H3), KY008219 (Act5C), KY007789 (18S), KY007885 (28S); CHNUFPI 0591.

Paratypes

BRAZIL – **Piauí** • 1 ♂; Castelo do Piauí, Fazenda Bonito, ECB Rochas Ornamentais do Brasil LTDA; 5°13′46.7″ S, 41°41′29.9″ W; 6 Dec. 2005; F.M. Oliveira-Neto leg.; CHNUFPI 2036 • 1 ♂; same data as for preceding; MPEG 7885 • 1 ♂; same data as for preceding; MPEG 35510.

Other material

BRAZIL – **Piauí** • 1 ♂; Castelo do Piauí, Fazenda Bonito, ECB Rochas Ornamentais do Brasil LTDA; 5°13′46.7″ S, 41°41′29.9″ W; 4–11 Dec. 2005; F.M. Oliveira-Neto; MPEG 7886 • 1 ♂; same data as for preceding; MPEG 7887 • 2 ♂♂; same data as for preceding; MPEG 7888 • 1 ♂; same data as for preceding; MPEG 7889 • 1 ♂; same data as for preceding; MPEG 7890 • 1 ♂; same data as for preceding; MPEG 7892 • 1 ♂; same data as for preceding; MPEG 7891 • 1 ♂; Teresina, Universidade Federal do Piauí, Departamento de Biologia; 5°3′30.4″ S, 42°47′29.63″ W; 10 Jan. 2008; L.S. Carvalho leg.; MPEG 35509.

Description

Male holotype (Figs 10–13)

Body measurements. Total length 6.58; carapace 3.89 long, 2.63 wide, narrowed to 1.66 in front, 1.24 high.

Colour in ethanol (Fig. 10A–G). Carapace orange-brown, cephalic groove and lateral margins dark brown, with interrupted stripes converging toward fovea but not reaching it; eyes ringed with black, all dark except PME and ALE provided with half median bright tapetum; chelicerae medium brown, paler ventromedially, labium medium brown, endites orange-brown, distally paler; sternum laterally reddish-brown, paler, orange-brown medially; legs: coxae orange brown, hind ones somewhat darker, femora

medium, paler dorsoapically and basoventrally, III further paler basodorsally, remaining segments yellowish-brown, palps medium brown; abdomen dorsum pale cream, medially with mottled dark grey

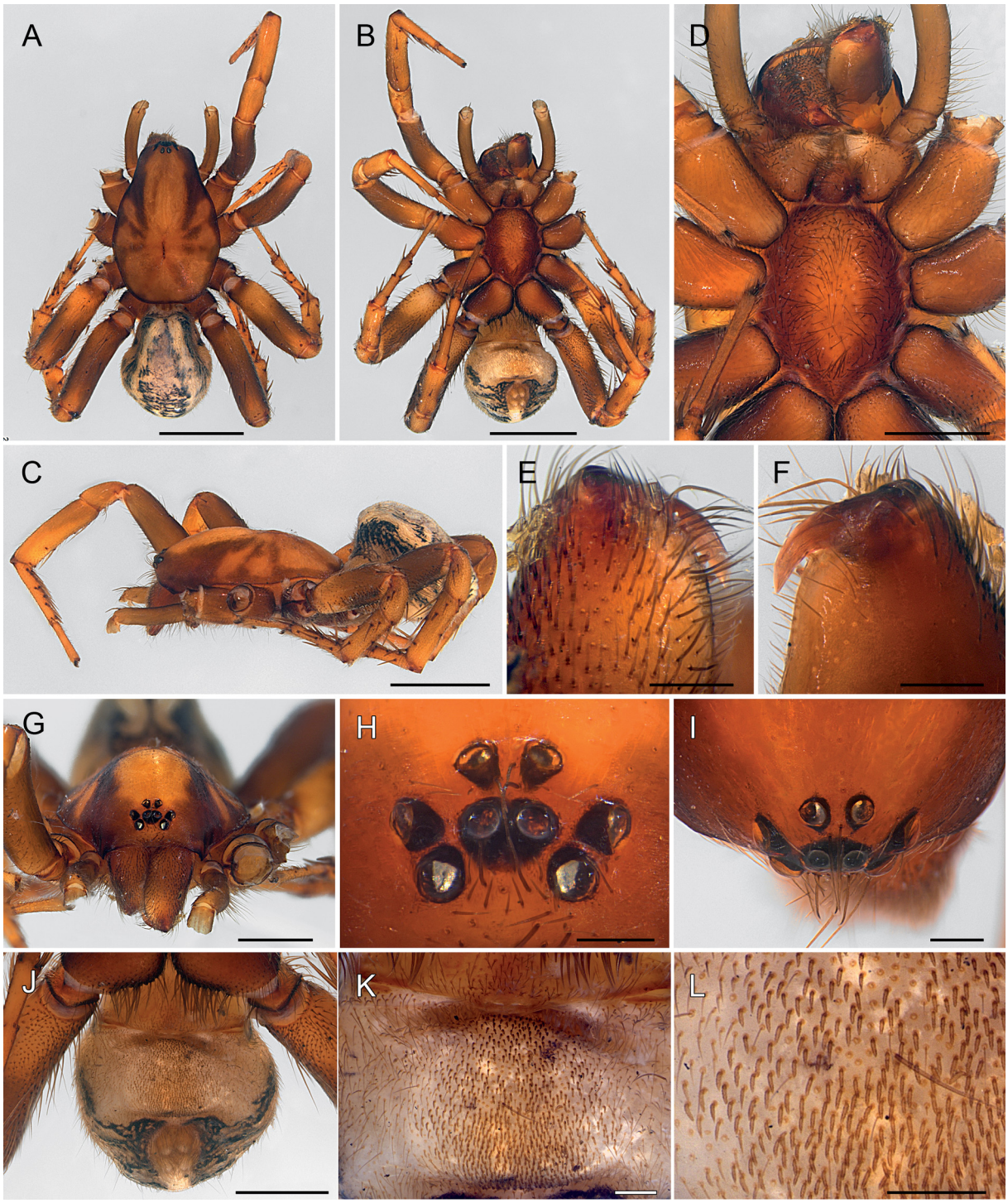

Fig. 10. *Cybaeodamus spinosissimus* sp. nov., holotype, ♂ (CHNUFPI 0591). **A**. Habitus, dorsal view. **B**. Idem, ventral view. **C**. Idem, lateral view. **D**. Sternum, ventral view. **E**. Left chelicerae, dorsal view. **F**. Idem, ventral view. **G**. Carapace, frontal view. **H**. Eye area, frontal view. **I**. Idem, dorsal view. **J**. Abdomen, ventral view. **K**. Idem, detail on the abdominal patch of spinose setae. **L**. Idem, detail on the spinose setae. Scale bars: A–C = 2 mm; D, G, J = 1 mm; E–F, H–I, K–L = 0.2 mm.

patches and stripes towards spinnerets, anteriorly with inverted V-shaped dark marking; venter pale cream, area posterior to epigastric slit with three longitudinal, blackish bands; spinnerets yellowish brown.

Carapace (Fig. 10A, C, G). Ovoid, with faint anterior constriction at level of palp trochanter, fovea narrow, longitudinal slit; profile domed, highest point in front of fovea, with slight depression at fovea level; cover of numerous thin silvery setae.

Eyes. Accompanied with few long setae (Fig. 10H); eye sizes and interdistances: AME: 0.12; ALE: 0.14; PME: 0.12: PLE: 0.18; AME–AME: 0.04; AME–ALE: 0.06; AME–PME: 0.08; AME–PLE: 0.16; ALE–ALE: 0.22; ALE–PLE: 0.05; ALE–PME: 0.22; PME–PME: 0.07; PME–PLE: 0.14. MOQ: frontal width 0.28, posterior width 0.31, length 0.32.

Clypeus. 0.23 high, provided with group of long setae (Fig. 10H). Chilum single, narrow. Chelicerae (Fig. 10E–F) 1.16 long, densely covered with thick setae, being longest apically, promargin with two teeth, retromargin without.

Sternum (Fig. 10D). 1.86 long, 1.44 wide, elongate oval, margins concave at coxa bases, with faint triangular extension fitting coxae I and II, uniformly covered with long- needle-like setae.

Legs. Covered with scattered fine setae, hind femora with row of long setae ventrolaterally, denser on IV, coxae IV inflated basoretrolaterally, touching each other, with retrolateral longitudinal brush of long, thick macrosetae (Fig. 10B, J); leg formula 4123 (Table 3). Leg spination as in Fig. 11.

Abdomen (Fig. 10A–C). Oval, 2.97 long and 2.23 wide, venter centrally with circular, dense patch of small spine-shaped setae (Fig. 10C, H).

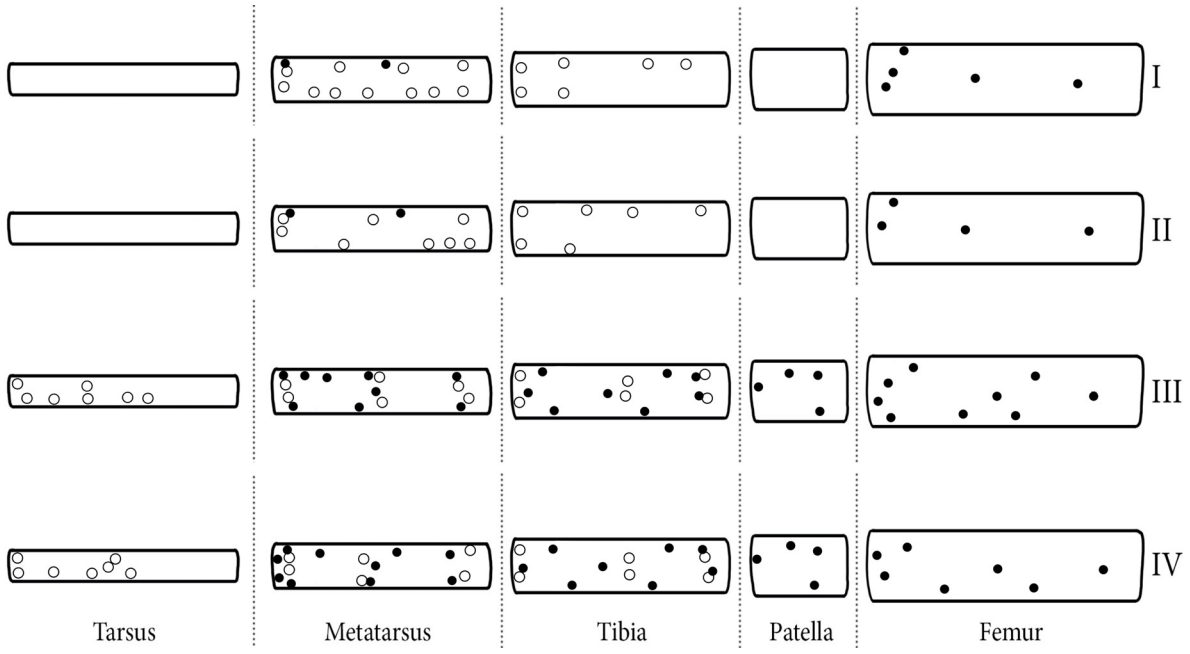

Fig. 11. *Cybaeodamus spinosissimus* sp. nov., holotype, ♂ (CHNUFPI 0591), spination. Dark circles represent dorsal and lateral spines, whereas white circles represent ventral spines (as if seen dorsally through transparency).

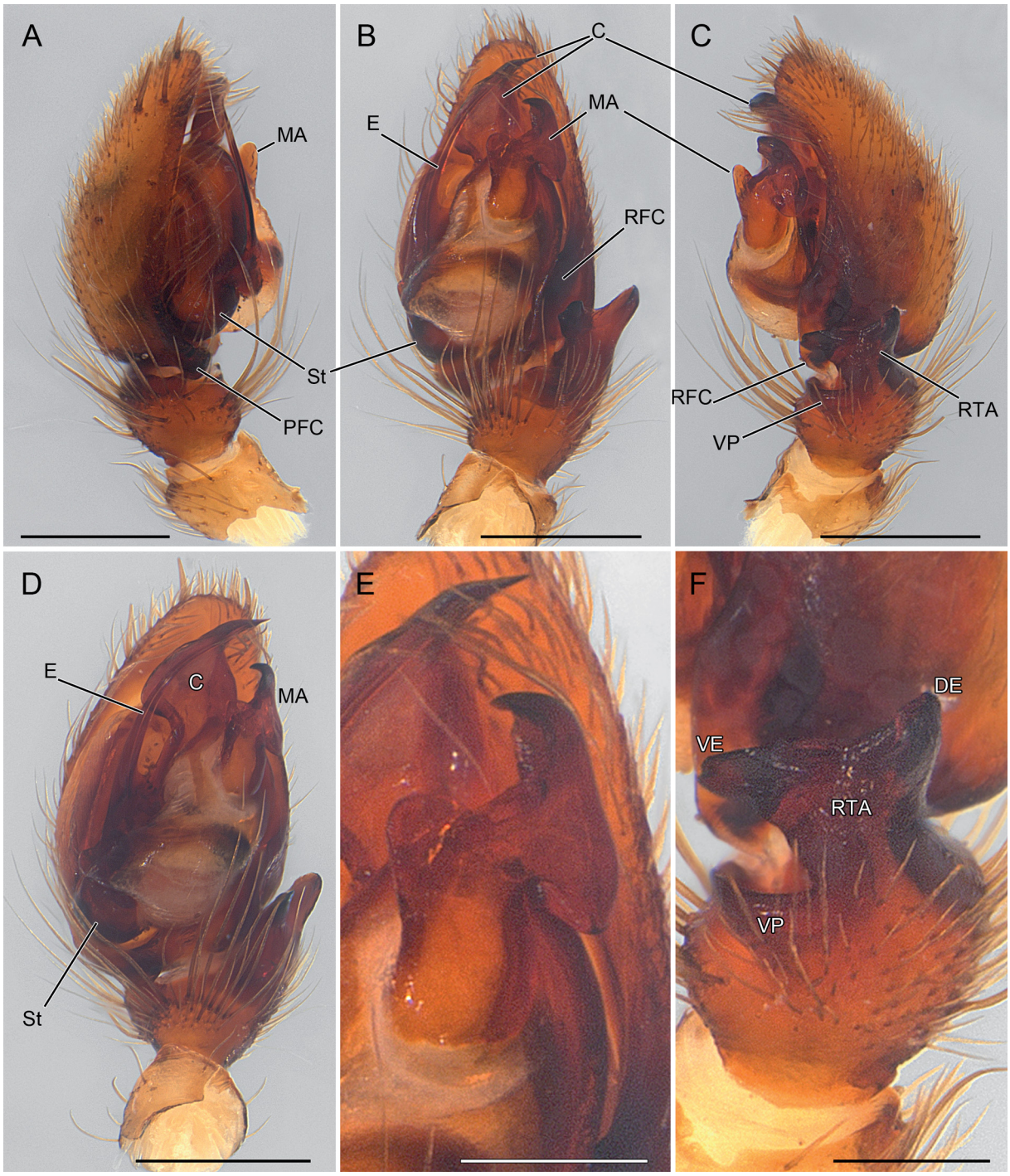

Fig. 12. *Cybaeodamus spinosissimus* sp. nov., holotype, ♂ (CHNUFPI 0591), palp. **A**. Prolateral view. **B**. Ventral view. **C**. Retrolateral view. **D**. Ventral, slightly prolateral view. **E**. Detail of median apophysis, ventral view. **F**. Detail of RTA, retrolateral view. Abbreviations: C = conductor; DE = dorsal extension of RTA; E = embolus; MA = median apophysis; PFC = probasal flange of cymbium; RFC = retrobasal flange of cymbium; RTA = palpal retrolateral tibial apophysis; St = subtegulum; VE = ventral extension of RTA; VP = ventral process. Scale bars: A–D = 0.5 mm; E–F = 0.2 mm.

Palp (Figs 12–13). Femur 1.52 long; tibia provided ventrally and prolaterally with groups of long setae; RTA stout, divided into two prongs: inferior basoventral one (VP) small, roughly triangular, and distal one wider and lateroapically provided with two extensions, ventral one (VE) straight and slightly notched, dorsal one (DE) blunt, slightly curved; cymbium elongate ovoid, with rounded tip, anterior half dorsally with thick patch of short, light setae, retrobasally with wide flange (RFC), basoprolaterally with stout flange (PFC), with four spines prolaterally and two spines apically; tegulum elongate, with median apophysis (MA) originating retrolaterally, complex axe-shaped, conductor (C) large, claw-shaped, with sharp tip; subtegulum (St) basoprolateral rounded bulge; embolus (E) originating probasally and directed straight forward, with prolateral boss at base, proximally large then tapered and slightly curved toward apex.

Female

Unknown.

Distribution

The species is known only from three localities in the state of Piauí, northeastern Brazil (Fig. 18).

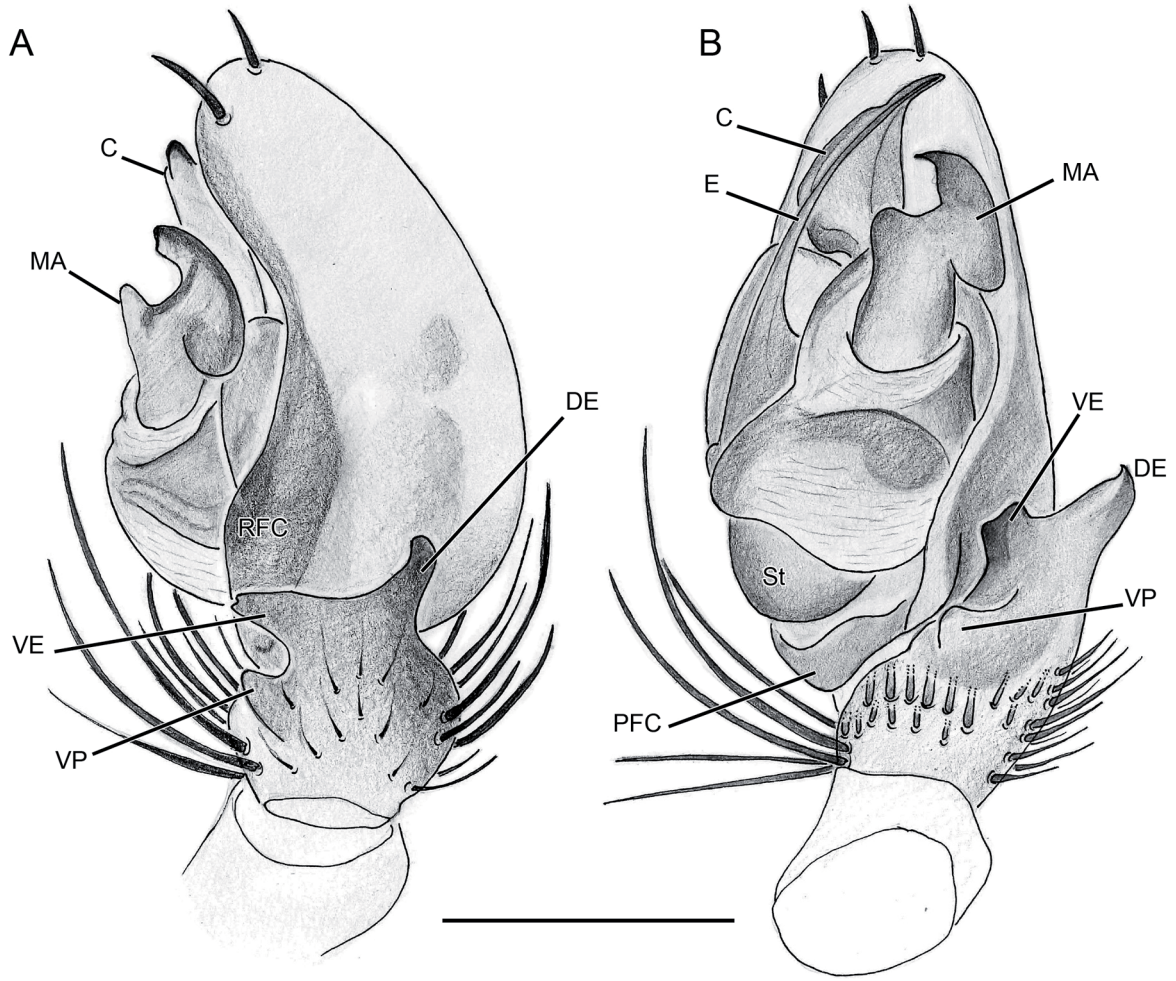

Fig. 13. *Cybaeodamus spinosissimus* sp. nov., holotype, ♂ (CHNUFPI 0591), palp. **A**. Prolateral view. **B**. Ventral view (ventral setae on tibia omitted). Abbreviations: C = conductor; DE = dorsal extension of RTA; E = embolus; MA = median apophysis; PFC = probasal flange of cymbium; RFC = retrobasal flange of cymbium; St = subtegulum; VE = ventral extension of RTA; VP = ventral process. Scale bar = 0.5 mm.

Table 3. Leg measurements of *Cybaeodamus spinosissimus* sp. nov., holotype, ♂ (CHNUFPI 591).

	Fe	P	Ti	Mt	t	Total
I	2.43	1.00	1.97	1.46	1.09	7.95
II	2.41	0.96	1.60	1.45	1.03	7.45
III	2.33	1.04	1.28	1.47	1.28	7.40
IV	2.53	1.23	1.67	1.91	1.42	8.76

Cybaeodamus malkini sp. nov.
urn:lsid:zoobank.org:act:354DEC2C-0C56-420C-86FE-A4EC45163812
Figs 14–17

Diagnosis

The male of this species resembles that of *C. tocantins* by sharing the group of strong macrosetae at the posterior tip of the sternum and the retromargin of the fourth coxae (Fig. 14C, I vs Lise *et al.* 2009: fig. 61), and by the shape of the RTA (Figs 16C, E, 17C vs Lise *et al.* 2009: fig. 65). These characteristics differentiate these species from all other congeners. However, *C. malkini* sp. nov. differs from *C. tocantins* by the shape of its tegular sclerites (Figs 16B, D, 17A–B, D–E vs Lise *et al.* 2009: fig. 63), and by the absence of a ventral process on both the coxae and femur of leg III (see Lise *et al.* 2009: fig. 62).

Remark

In the diagnosis of *C. tocantins* by Lise *et al.* (2009), a ventral process on femur IV is mistakenly mentioned. However, the description and the fig. 62 refer to a ventral process on both the coxae and femur of leg III, which should align with the observed morphology.

Etymology

The specific name is a patronym in honour of Borys Malkin a dedicated naturalist and collector of the holotype.

Material examined

Holotype

BRAZIL • ♂; Mato Grosso, Santa Terezinha, Barra do Tapirapé; 10°28′14.9″ S, 50°30′22.7″ W; 11–30 Dec. 1960; B. Malkin leg.; AMNH.

Description

Male holotype (Figs 14–17)

Body measurements. Total length 4.83; carapace 2.65 long, 1.78 wide, narrowed to 1.15 in front, 0.92 high.

Colour in ethanol (Fig. 14A–B, D–E). Carapace, cephalic area yellowish brown, cephalic groove dark brown, thoracic area medium brown with transverse pale stripes, half as long as carapace width, crossing middle of dark brown fovea; chelicerae, labium and endites medium brown, distally paler; sternum medium brown, paler towards centre; legs and palps pale yellow, with femora darker, medium brown; abdomen and spinnerets entirely pale cream.

Carapace (Fig. 14A, D–E). Oval, with marked constriction at palp trochanter level; profile slightly doomed, with slight depression at level of fovea, highest point posterior to fovea.

Eye (Fig. 14F). Sizes and interdistances: AME: 0.09; ALE: 0.11; PME: 0.10: PLE: 0.11; AME–AME: 0.03; AME–ALE: 0.04; AME–PME: 0.05; AME–PLE: 0.06; ALE–ALE: 0.16; ALE–PLE: 0.03; ALE–PME: 0.15; PME–PME: 0.04; PME–PLE: 0.08. MOQ: frontal width 0.21, posterior width 0.24, length 0.24.

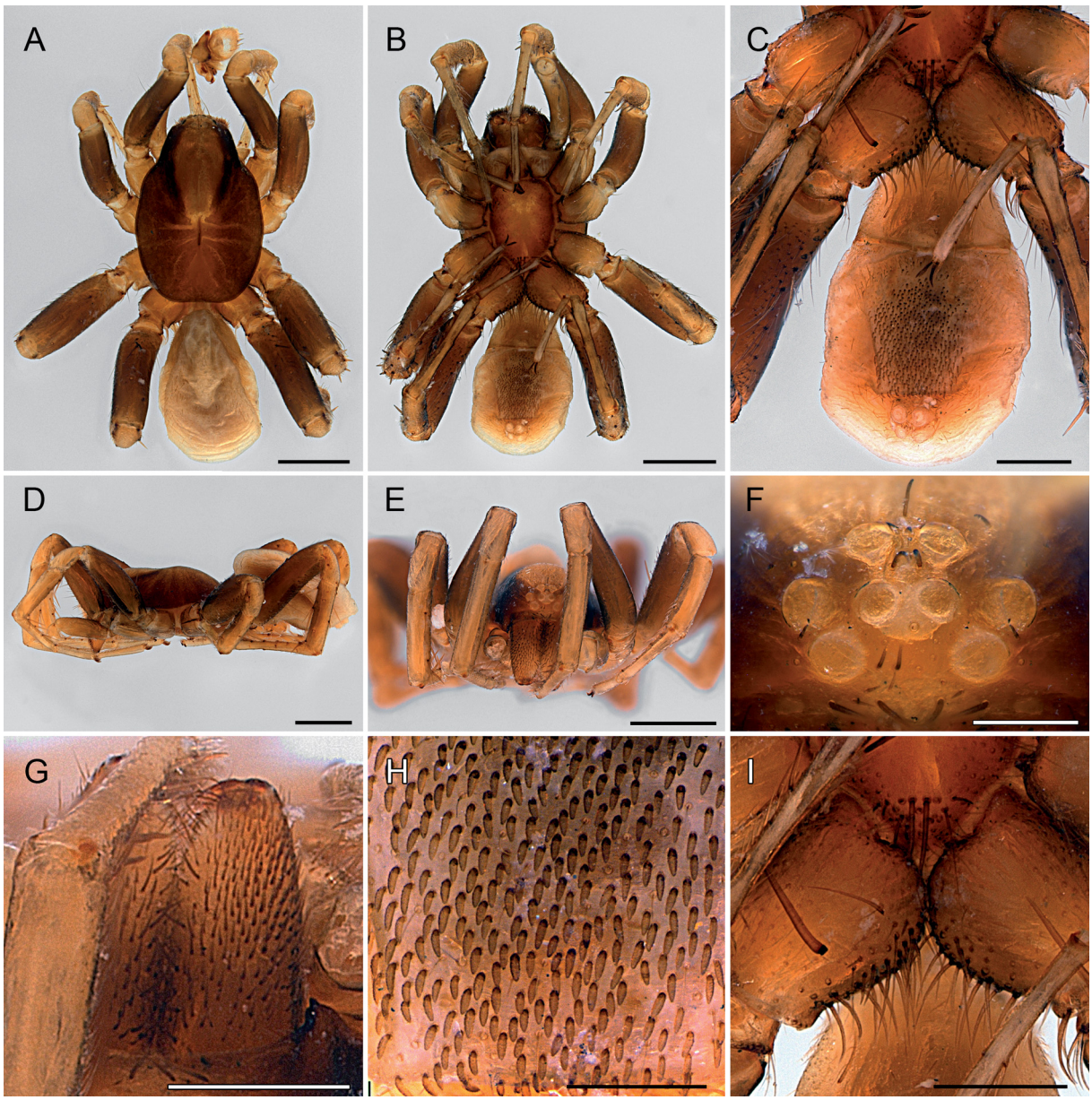

Fig. 14. *Cybaeodamus malkini* sp. nov., holotype, ♂ (AMNH). **A**. Habitus, dorsal view. **B**. Idem, ventral view. **C**. Abdomen, ventral view. **D**. Habitus, lateral view. **E**. Idem, frontal view. **F**. Eyes, frontal view. **G**. Chelicerae, dorsal view. **H**. Detail of abdominal spinose setae, ventral view. **I**. Posterior part of sternum and coxae IV, showing groups of strong macrosetae posteriorly, ventral view. Scale bars: A–B, D–E = 1 mm; C, G, I = 0.5 mm; F, H = 0.2 mm.

Table 4. Leg measurements of *Cybaeodamus malkini* sp. nov., holotype, ♂ (AMNH).

	Fe	P	Ti	Mt	t	Total
I	1.61	0.70	1.33	1.40	0.84	5.88
II	1.54	0.70	1.26	1.05	0.77	5.32
III	1.54	0.70	0.98	1.26	0.91	5.39
IV	1.82	0.70	1.33	1.75	0.98	6.58

Clypeus (Fig. 14E–F). 0.11 high, provided with few thick setae. Chilum not visible. Chelicerae (Fig. 14G) 0.76 long, densely covered with setae, promargin with two teeth, retromargin without.

Sternum (Fig. 14B–C, I). Elongate oval, 1.28 long, 0.92 wide, lateral margins sinuous, cover of setae denser laterally, posteriorly with group of long, thick macrosetae.

Legs (Fig. 14A–E, I). Femora ventrally with long bristles, denser on hind legs; coxae IV inflated basoretrolaterally, touching each other, with retrolateral longitudinal brush of long, thick macrosetae (Fig. 14I). Leg formula 4132 (Table 4). Leg spination as in Fig. 15.

Abdomen (Fig. 14A–C). Ovoid, venter medially with dense, oval patch of small, thick, spine-shaped setae (Fig. 14H).

Palp (Figs 16–17). Femur 1.10 long; tibia ventrally with group of long, curved setae; RTA provided with two prongs: superior one with prolateral side concave, with distal part slightly curved down, blunt

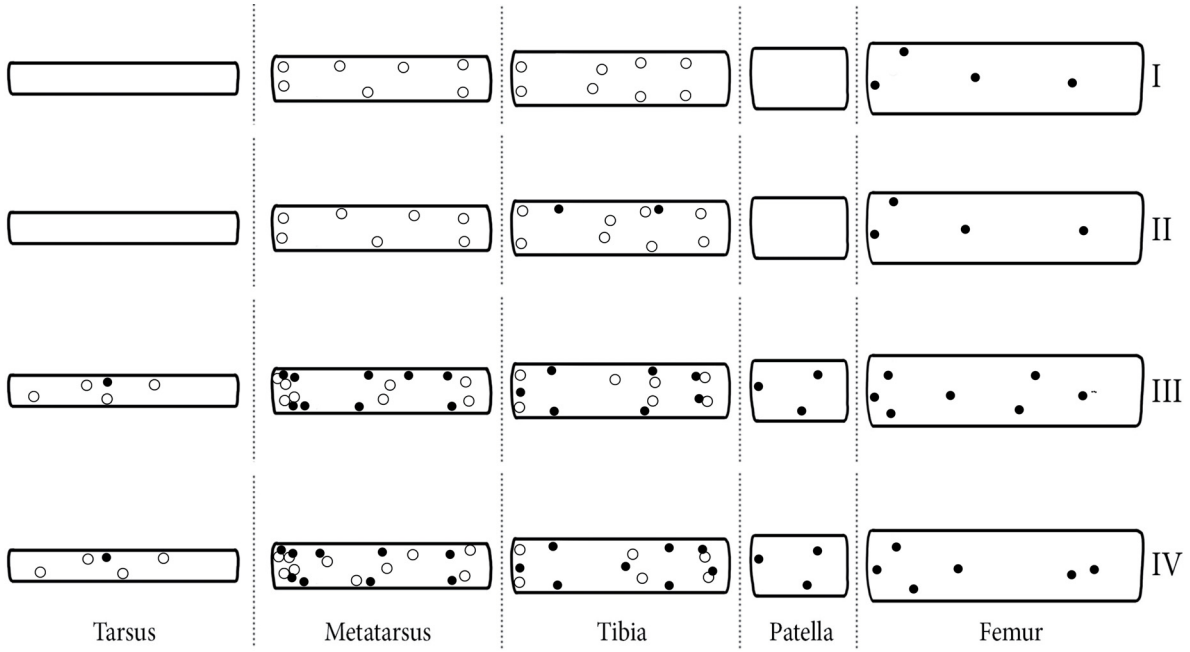

Fig. 15. *Cybaeodamus malkini* sp. nov., holotype, ♂ (AMNH), spination. Dark circles represent dorsal and lateral spines, whereas white circles represent ventral spines (as if seen dorsally through transparency).

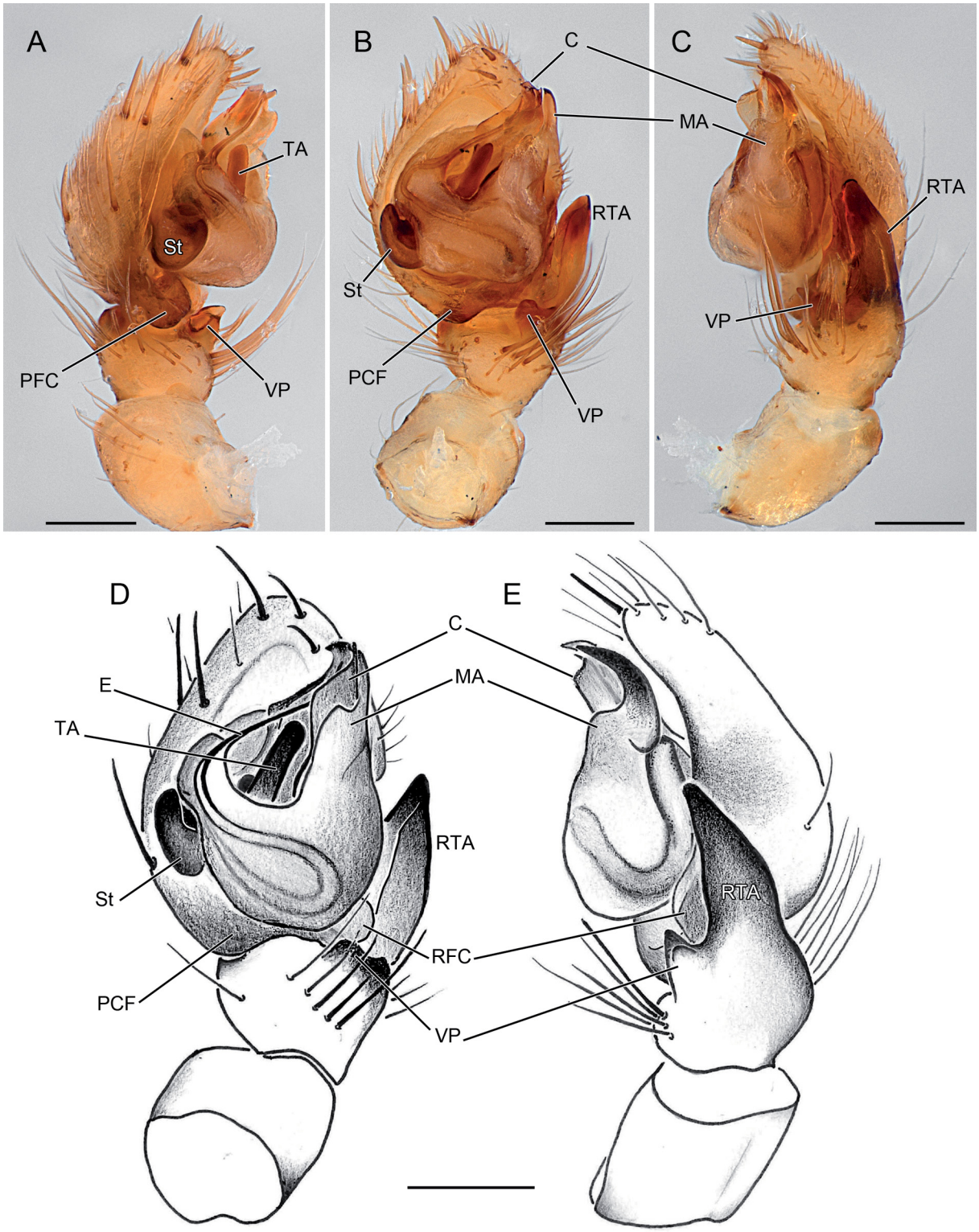

Fig. 16. *Cybaeodamus malkini* sp. nov., holotype, ♂ (AMNH), palp. **A**. Prolateral view. **B, D**. Ventral view. **C, E**. Retrolateral view. Abbreviations: C = conductor; E = embolus; MA = median apophysis; PFC = probasal flange of cymbium; RFC = retrobasal flange of cymbium; RTA = retrolateral tibial apophysis; St = subtegulum; TA = additional tegular apophysis; VP = ventral process. Scale bars = 0.2 mm.

tip, three times as long, inferior one (VP) with slightly sharper tip; cymbium ovoid, prolaterally with five strong spines and subapically with two ventral spines, with stout probasal flange (PCF) and slender retrolateral flange (RCF); tegulum complex with two narrow prongs pointing forward: one straight (TA), cylindrical with blunt tip, obliquely situated in the middle (Fig. 16A), other one (MA) retroanteriorly placed, slightly longer and sickle-shaped with sharp tip (Fig. 16B); subtegulum (St) emerging prolaterally as strongly sclerotized knob; conductor (C) large, folded; embolus (E) originating proanteriorly, above prolateral subtegular knob, simple, slender, emerging straight retrolaterad, then apically slightly curved, base with small boss prolaterally.

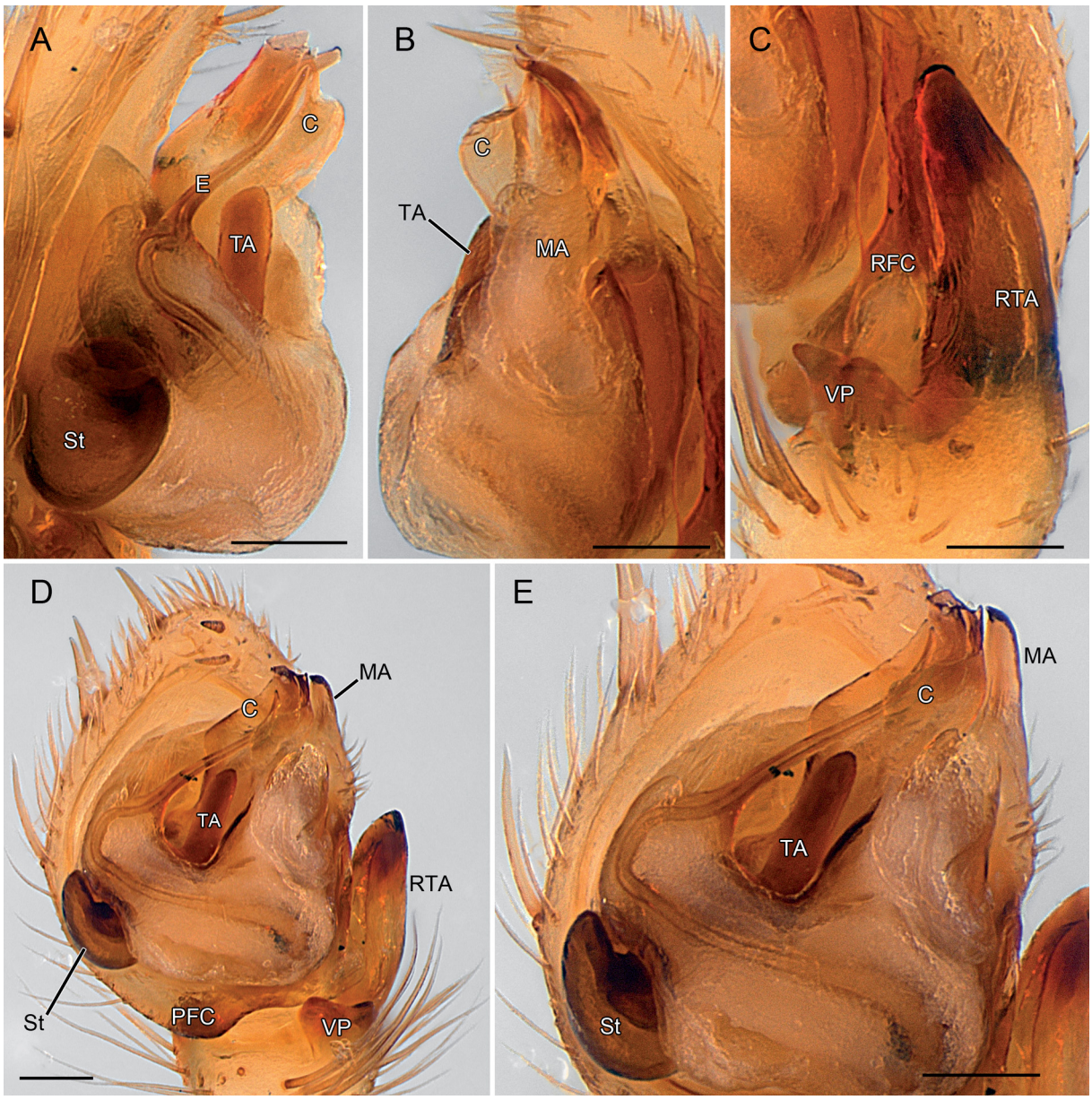

Fig. 17. *Cybaeodamus malkini* sp. nov., holotype, ♂ (AMNH), details of palp. **A**. Bulb, prolateral view. **B**. Idem, retrolateral view. **C**. RTA, retrolateral view. **D–E**. Bulb, ventral view. Abbreviations: C = conductor; E = embolus; MA = median apophysis; PFC = probasal flange of cymbium; RFC = retrobasal flange of cymbium; RTA = retrolateral tibial apophysis; TA = additional tegular apophysis; St = subtegulum; VP = ventral process. Scale bars = 0.1 mm.

Female

Unknown.

Distribution

The species is known only from the type locality in Brazil (Fig. 18).

Discussion

The diagnosis of *Cybaeodamus* remains questionable. According to Jocqué (1991), males of this genus can be identified by their palps, which are provided with two tegular apophyses. However, in his descriptions of *Cybaeodamus ornatus* and *Cybaeodamus enigmaticus*, we understand that the distal apophysis, qualified as 'large and complex' actually corresponds to a well-developed conductor-like terminal sclerite of the tegulum, besides the tegular so-called median apophysis (MA) which is of similar size and can also be more or less complex. This conductor is further typically provided with a groove accommodating the embolus (Figs 5D–E, 6A 13B–D; see also Lise *et al.* 2009: fig. 2). The combination of a median apophysis and a sclerotized conductor also occurs in other zodariid genera (such as *Mallinella* Strand, 1906 and other closely related genera) and can thus not represent a unique diagnostic generic trait. Saying that, it appears that *Cybaeodamus malkini* sp. nov. has a third additional, distinctive tegular apophysis arising centrally on the bulb, between the base of the embolus and the MA (see Figs 16A–B, D, 17A, D–E). The fact that in the cladistic analysis of Jocqué (1991: fig. 41), *Cybaeodamus* is the only genus without an autapomorphy, indicates why the diagnosis of the genus remains problematic. In this study, we have provided an updated diagnosis for the genus *Cybaeodamus* by providing a combination of morphological characters. While this work establishes an initial framework for identification, we emphasize that future research, particularly a comprehensive taxonomic revision complemented by phylogenetic analyses, will be essential to rigorously evaluate the

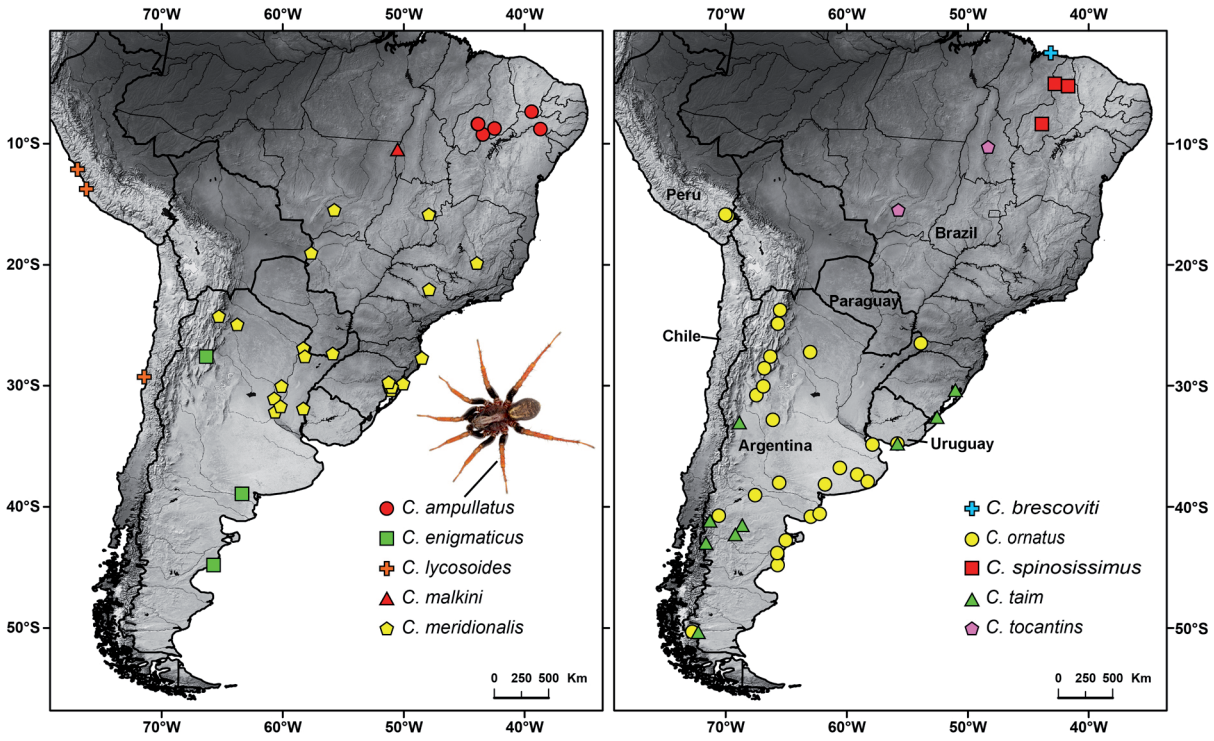

Fig. 18. Distribution map of now records of species of *Cybaeodamus* Mello-Leitão, 1938, emphasizing the newly described species in red. *Cybaeodamus lentiginosus* (Simon, 1905) reported from "Puerto Camarones" in Argentina not shown. Photo: *C. ampullatus* sp. nov. (CHNUFPI 7528).

genus monophyly and confirm potential synapomorphies (e.g., the abdominal ventral patch of modified setae in males). Such efforts would not only refine the diagnostic boundaries of *Cybaeodamus* but also enhance its reliable differentiation from other zodariid genera.

Zodariidae now contain 90 genera and more than half of these are represented by six species or less (WSC 2025). As mentioned in Jocqué & Henrard (2024), Zodariidae tend to have small distribution areas, a phenomenon contrasting with the huge area occupied by some *Asceua* Thorell, 1887, the genus they revised in the article. The occupation of small areas certainly applies to the speciose genera, e.g., *Mallinella* (233 species), *Zodarion* Walckenaer, 1826 (169), *Tenedos* O. Pickard-Cambridge, 1897 (80), *Diores* Simon, 1893 (60), *Storena* Walckenaer, 1805 (54). But it may be questioned if this is also the case for smaller genera. *Cybaeodamus* now contains 11 species and will probably still be expanded with more species in the future. Some of the species in the genus have very large distributions. A possible explanation of this discrepancy may have to do with the phylogenetic position of the taxa. It might be that the older clades have species with larger distributions than the derived ones. It is not evident to test this hypothesis for several reasons: many of the genera have hardly been studied (e.g., *Cydrela* Thorell, 1873) or need a revision to test the splitting they have undergone (e.g., *Cryptothele* L. Koch, 1872), which could profoundly change the size of their distribution area. For many species the real size of their area is indeed still not known in detail. It is therefore too early to try to explain the phenomenon, but it may present an interesting direction of research in the future.

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