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A new genus of spiders from the Northern Andes, with a unique type of female stridulatory organ (Araneae, Pholcidae)

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Abstract. Pholcidae are among the most abundant and species-rich spider families in tropical and subtropical regions worldwide. However, despite considerable recent efforts, much of this diversity remains undescribed. Here, we describe the new genus *Tunda* Huber gen. nov. from the Northern Andes (Ecuador and Colombia), including the following nine new species, all described from males and females: *T. icazai* Huber gen. et sp. nov., *T. pachoca* Huber gen. et sp. nov., *T. nadineae* Huber gen. et sp. nov., *T. totoro* Huber gen. et sp. nov., *T. muki* Huber gen. et sp. nov., *T. otonga* Huber gen. et sp. nov., *T. chasca* Huber gen. et sp. nov., *T. ayahuma* Huber gen. et sp. nov., and *T. angel* Huber gen. et sp. nov. Representatives of *Tunda* are dark, medium-sized (body length ~2.5–4.5 mm) pholcids with medium-long legs that typically lead reclusive lives in holes in the ground or at ground level in humid forests, often with the web visible from outside while the spider remains hidden deep inside the hole. Females of most species share a unique type of stridulatory organ composed of a row of modified hair-bases on femur 4 and a narrow band (two parallel rows) of modified hair bases laterally on the abdomen. The abdominal band of hair-bases is not located on the book-lung cover, a position that is usually associated with signal amplification. We thus hypothesize that it is used in a short-range, intrasexual context, i.e., during courtship or copulation. In order to place the results in a wider context, we present an overview of stridulation in Pholcidae. The emerging picture shows two fundamentally different types of stridulation within the family: (1) male-dominated cheliceral stridulation (palp-chelicera), possibly plesiomorphic but virtually absent in the two species-rich subfamilies Pholcinae and Modisiminae, with a mainly luring (male) and rarely defensive/deterring (female) function; (2) female-dominated abdominal stridulation (usually abdomen-prosoma), with numerous independent origins but with currently very limited information regarding function.

Keywords. *CO1* barcodes, Colombia, Ecuador, stridulation, taxonomy.

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Introduction

Relative to its size, Ecuador is possibly the most species-rich country in the world, at least with respect to formally described species (Sierra *et al.* 2002; Lessmann *et al.* 2014; Cuesta *et al.* 2017). Its territory includes not only an extensive area of the megadiverse Amazon forest but also parts of two biodiversity hotspots, the tropical Andes (the richest and most diverse biodiversity hotspot on Earth) and the Tumbes-Chocó-Magdalena hotspot (Mittermeier *et al.* 2004). Such designations are usually based on data from plants and vertebrates, and this is true for the hotspot concept as well. Invertebrates are largely missing in such analyses even though they make up the overwhelming majority of species on Earth (Basset *et al.* 2012; Hamilton *et al.* 2013; Stork *et al.* 2015; Stork 2018), play key roles in many ecosystem processes (Coleman & Hendrix 2000), and may be particularly susceptible to changes of climate and landscape (Dunn 2004; Samways 2005).

Spiders are a good example of such a megadiverse taxon with dramatic effects on ecosystems (Nyffeler & Birkhofer 2017; Cardoso *et al.* 2025) in which the lack of comprehensive data limits the wider impact of the available information. More than 50 000 species are formally described (World Spider Catalog 2026), but this may amount to less than half of the actual global species richness (Agnarsson *et al.* 2013). While the taxonomic task ahead might appear intimidating, the example of Ecuador also shows that focused and dedicated research (in this case mainly by N. Dupérré and coworkers) can dramatically improve our understanding of a regional fauna in a relatively short period of time. Taxonomic research with an emphasis on comprehensive and revisional treatments (rather than single-species descriptions that are still widespread in spider taxonomy) has more than doubled the number of formally described spider species from Ecuador within 10 years (N. Dupérré, pers. com. 25 Jan. 2025; e.g., Dupérré & Tapia 2016, 2017, 2020, 2023, 2024, 2025).

Pholcidae C.L. Koch, 1850 are among the most species-rich spider families (World Spider Catalog 2026), with a large percentage of their species richness in tropical and subtropical regions around the globe (Huber & Chao 2019). The tropical Andean countries are possibly among the most species-rich regions as far as Pholcidae are concerned, yet the pholcid fauna of this area is still poorly known. Again, mainland Ecuador serves as a good example: up to 2021, only 14 species had been recorded, based on a published total of only 59 specimens (Huber & Herrera 2021). Some of the 'known' species actually had to be considered 'unknown', such as two species described in Schmidt (1971) based on specimens imported to Germany with bananas originating from Ecuador; their rudimentary descriptions lack illustrations, the types are lost, and the exact type localities are unknown. In 2021, during a short but focused collecting campaign, we visited a total of 38 localities and collected 828 adult specimens that were tentatively assigned to 69 morphospecies. Approximately 63 species (i.e., ~91%) were considered new to science (Huber & Herrera 2021). A similar pattern of extreme diversity and poor prior knowledge became evident in Colombia in 2022, when we visited 46 localities and collected 1353 adult specimens representing about 90 morphospecies, of which roughly 77 (i.e., ~85%) appeared to be new. Notably, 64 species (71%) were found at only a single locality, suggesting a high level of small-scale endemism. This 2022 collection is by far the largest ever assembled for Colombian Pholcidae and highlights the urgent need for further taxonomic and phylogenetic work in the region. A small part of this Ecuadorian and Colombian material has been formally described in the meantime (Huber *et al.* 2023a, 2023b, 2024a, 2024b, 2026; Huber & Meng 2025). The present paper deals with a further group of pholcids included in these collections. These spiders are characterized by a unique type of female stridulation, so we use this opportunity to review stridulation in Pholcidae.

Material and methods

Material examined

This study is based on the examination of 215 adult specimens deposited in the following collections: Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, Colombia (ICN); Instituto Nacional de Biodiversidad, Quito, Ecuador (INABIO); Museo de Entomología de la Universidad del Valle, Cali, Colombia (MUSENUV); Museum of Invertebrates, Pontificia Universidad Católica, Quito, Ecuador (QCAZI); and Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany (ZFMK).

Taxonomy and morphology

Taxonomic descriptions follow the style of recent publications on Modisiminae Simon, 1893 (e.g., Huber *et al.* 2023b; based on Huber 2000). Species descriptions are arranged as in Fig. 1. Measurements were done on a dissecting microscope with an ocular grid and are in mm unless otherwise noted; eye measurements are ± 5 µm. Photos were made with a Canon EOS 2000D digital camera mounted on a Nikon SMZ 18 stereo microscope or a Nikon Coolpix 995 digital camera mounted on a Leitz Dialux 20 compound microscope. CombineZP (https://combinezp.software.informer.com/) was used for stacking photos. Drawings are partly based on photos that were traced on a light table and finalized under a dissecting microscope, or they were directly drawn with a Leitz Dialux 20 compound microscope using a drawing tube. Cleared epigyna were stained with chlorazol black. Illustrations are usually from the specific specimen described, but sometimes from another specimen from the same locality (as detailed in the figure legends). The number of decimals in coordinates gives a rough indication about the accuracy of the locality data: four decimals means that the collecting site is within about 10 m of the indicated spot; three decimals: within ~100 m; two decimals: within ~1 km. The distribution map was generated with ArcGIS Pro ver. 3.3.0 (Environmental Systems Research Institute, Redlands, CA).

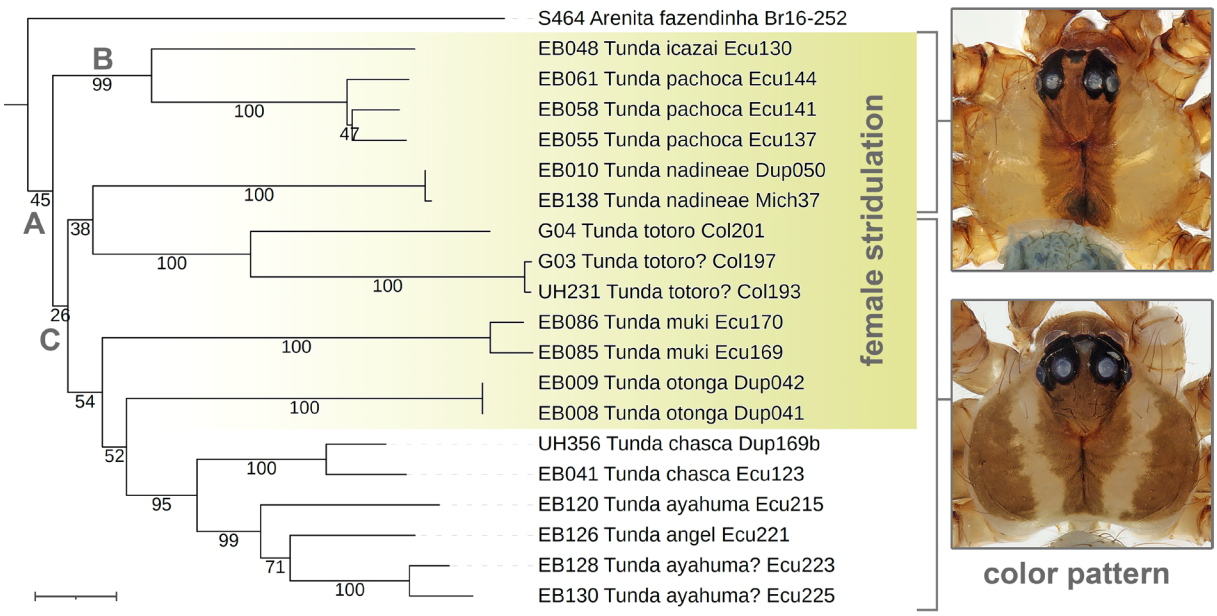

Fig. 1. Neighbor-joining tree of analyzed *CO1* sequences using the Kimura 2-parameter model (rooting taxon not shown); numbers on the branches are bootstrap supports from 10000 replications (%). Putative origins of selected characters mentioned in the text are mapped on the tree. "A". Female stridulation; dark median band on carapace; pair of slender processes distally on genital bulb. "B". Male chelicerae with row of 5–7 small apophyses on each side. "C". Male femora with spines. Tree scale: 0.01.

Table 1. Geographic origins and GenBank accession numbers of all available *Tunda* Huber gen. nov. sequences, sorted as in Fig. 1.

Code	Genus	Species	Vial	Country	Admin.	Locality	Lat	Long	*CO1*
EB048	*Tunda*	*icazai*	Ecu130	Ecuador	Manabí	Jama-Coaque Reserve	-0.1190	-80.1240	PZ318575
EB061	*Tunda*	*pachoca*	Ecu144	Ecuador	Manabí	near Cruz de Guanábano	-1.7519	-80.3820	PZ318578
EB058	*Tunda*	*pachoca*	Ecu141	Ecuador	Manabí	between Puerto Cayo and Jipijapa	-1.3370	-80.6593	PZ318577
EB055	*Tunda*	*pachoca*	Ecu137	Ecuador	Manabí	Pachoca Reserve	-1.0700	-80.8900	PZ318576
EB010	*Tunda*	*nadineae*	Dup050	Ecuador	Cotopaxi	Otonga Nature Reserve	-0.4199	-79.0062	PZ318573
EB138	*Tunda*	*nadineae*	Mich37	Ecuador	Cotopaxi	Otonga Nature Reserve	-0.4197	-78.9971	PZ318570
G04	*Tunda*	*totoro*	Col201	Colombia	Cauca	Vereda Brisas de Totoro	2.5571	-76.5739	PZ318588
G03	*Tunda*	*totoro*?	Col197	Colombia	Valle del Cauca	Reserva Madhú ‘site 2’	3.6287	-76.1659	PZ318587
UH231	*Tunda*	*totoro*?	Col193	Colombia	Valle del Cauca	Reserva Madhú ‘site 1’	3.6371	-76.1455	PZ318585
EB086	*Tunda*	*muki*	Ecu170	Ecuador	Tungurahua	between Baños and Puyo	-1.3880	-78.3080	PZ318580
EB085	*Tunda*	*muki*	Ecu169	Ecuador	Tungurahua	S of Baños	-1.4134	-78.4340	PZ318579
EB009	*Tunda*	*otonga*	Dup042	Ecuador	Cotopaxi	Otonga Nature Reserve	-0.4199	-79.0062	PZ318572
EB008	*Tunda*	*otonga*	Dup041	Ecuador	Cotopaxi	Otonga Nature Reserve	-0.4199	-79.0062	PZ318571
UH356	*Tunda*	*chasca*	Dup169b	Ecuador	Cotopaxi	Otonga Nature Reserve	-0.4199	-79.0062	PZ318586
EB041	*Tunda*	*chasca*	Ecu123	Ecuador	Pichincha	between San Juan and Chiriboga	-0.2327	-78.7497	PZ318574
EB120	*Tunda*	*ayahuma*	Ecu215	Ecuador	Sucumbíos	near La Bonita	0.4740	-77.5580	PZ318581
EB126	*Tunda*	*angel*	Ecu221	Ecuador	Carchi	near El Ángel	0.6178	-77.9261	PZ318582
EB128	*Tunda*	*ayahuma*?	Ecu223	Ecuador	Carchi	El Chical road ‘site 1’	0.8322	-78.2252	PZ318583
EB130	*Tunda*	*ayahuma*?	Ecu225	Ecuador	Carchi	El Chical road ‘site 2’	0.8303	-78.2102	PZ318584

Table 2. *CO1* Kimura 2-parameter (K2P) genetic distances among sequenced ingroup specimens, calculated from the untrimmed alignment using MEGA 11. Pairwise deletion strategy was used to deal with gaps/missing data in the alignment. Taxa are sorted as in Fig. 1. Bold: intraspecific distances.

	EB048	EB061	EB058	EB055	EB010	EB138	G04	G03	UH231	EB086	EB085	EB009	EB008	UH356	EB041	EB120	EB126	EB128
EB048_Tunda_icazai_Ecu130																		
EB061_Tunda_pachoca_Ecu144	0.130																	
EB058_Tunda_pachoca_Ecu141	0.124	**0.027**																
EB055_Tunda_pachoca_Ecu137	0.126	**0.031**	**0.025**															
EB010_Tunda_nadineae_Dup050	0.174	0.176	0.176	0.178														
EB138_Tunda_nadineae_Mich37	0.176	0.178	0.178	0.180	**0.002**													
G04_Tunda_totoro_Col201	0.201	0.205	0.208	0.206	0.181	0.183												
G03_Tunda_totoro?_Col197	0.215	0.206	0.208	0.198	0.186	0.188	**0.129**											
UH231_Tunda_totoro?_Col193	0.218	0.204	0.206	0.196	0.189	0.191	**0.127**	**0.003**										
EB086_Tunda_muki_Ecu170	0.207	0.197	0.195	0.212	0.206	0.208	0.211	0.230	0.233									
EB085_Tunda_muki_Ecu169	0.214	0.196	0.202	0.215	0.209	0.211	0.212	0.240	0.238	**0.019**								
EB009_Tunda_otonga_Dup042	0.202	0.192	0.186	0.182	0.194	0.194	0.196	0.214	0.212	0.193	0.194							
EB008_Tunda_otonga_Dup041	0.202	0.192	0.186	0.182	0.194	0.194	0.196	0.214	0.212	0.193	0.194	**0.000**						
UH356_Tunda_chasca_Dup169b	0.154	0.157	0.151	0.151	0.165	0.165	0.167	0.183	0.181	0.182	0.175	0.159	0.159					
EB041_Tunda_chasca_Ecu123	0.150	0.163	0.163	0.157	0.167	0.167	0.171	0.193	0.191	0.190	0.189	0.165	0.165	**0.034**				
EB120_Tunda_ayahuma_Ecu215	0.196	0.184	0.180	0.182	0.188	0.190	0.180	0.183	0.181	0.183	0.193	0.161	0.161	0.104	0.106			
EB126_Tunda_angel_Ecu221	0.163	0.186	0.176	0.182	0.170	0.172	0.178	0.196	0.198	0.185	0.192	0.146	0.146	0.105	0.112	0.089		
EB128_Tunda_ayahuma?_Ecu223	0.190	0.178	0.174	0.178	0.182	0.184	0.188	0.198	0.196	0.197	0.192	0.155	0.155	0.106	0.117	**0.084**	0.067	
EB130_Tunda_ayahuma?_Ecu225	0.199	0.191	0.183	0.185	0.187	0.189	0.187	0.202	0.200	0.196	0.195	0.164	0.164	0.115	0.122	**0.088**	0.079	**0.025**

Abbreviations

ALE = anterior lateral eye(s)
ALS = anterior lateral spinneret(s)
AME = anterior median eye(s)
a.s.l. = above sea level
L/d = length/diameter
PME = posterior median eye(s)
PMS = posterior median spinneret(s)

Abbreviations used in figures only are explained in the figure legends.

Molecular data and analyses

In order to support species limits and matching of sexes (rather than to infer phylogeny), we generated and analyzed *CO1* barcodes of 19 specimens of *Tunda* Huber gen. nov. representing the nine known species (Table 1). As outgroups, we used one species of Modisiminae (S464 *Arenita fazendinha* Huber & Carvalho, 2019) from Eberle *et al.* (2018) and – for rooting the tree – UH564 *Chisosa calapa* Huber, Meng & Valdez-Mondragón, 2024 from Huber *et al.* (2024c).

The *CO1* barcodes were assembled, checked for identification and aligned as described in Huber & Meng (2024). A neighbor-joining (NJ) tree (Saitou & Nei 1987) and genetic distances among specimens were calculated using the Kimura 2-parameter model (Kimura 1980) in MEGA ver. 11 (Tamura *et al.* 2021), during which pairwise deletion of gaps in the alignment was applied. The NJ tree (Fig. 1) was assessed with 10 000 bootstrap replications (Felsenstein 1985). The online tool iTOL (ver. 7) (Letunic & Bork 2021; https://itol.embl.de/) was used for tree visualization.

Results

Taxonomy

Class Arachnida Lamarck, 1801
Order Araneae Clerck, 1757
Family Pholcidae C.L. Koch, 1850

Genus ***Tunda*** Huber gen. nov.
urn:lsid:zoobank.org:act:67CBCF3D-81E3-48AF-A8CD-05DF6C8750A9

Type species

Tunda muki gen. et sp. nov.

Diagnosis

Dark, medium-sized (body length ~2.5–4.5 mm) pholcids (Fig. 2) with eight eyes, medium-long legs (tibia 1 L/d in males: ~35–75; in females: ~25–65), and dark median band on carapace (Fig. 2). A core-group of six species is easily diagnosed by the presence of a unique female stridulatory organ between abdomen and femur 4 (Figs 14, 18, 22) (absent in *T. chasca* Huber gen. et sp. nov., *T. ayahuma* Huber gen. et sp. nov., and *T. angel* Huber gen. et sp. nov.). Males of all species with pair of slender processes distally on genital bulb, in addition to main bulbal apophysis (processes #1 and #2 in Figs 6E, 12E, 28E). Males of most species also with distinctive arrangement of spines on anterior femora (femur 1 or femora 1 and 2), with numerous short spines (~50–150 µm) and a few long spines (~250–400 µm) (Fig. 19D) (absent in *T. icazai* Huber gen. et sp. nov. and *T. pachoca* Huber gen. et sp. nov.).

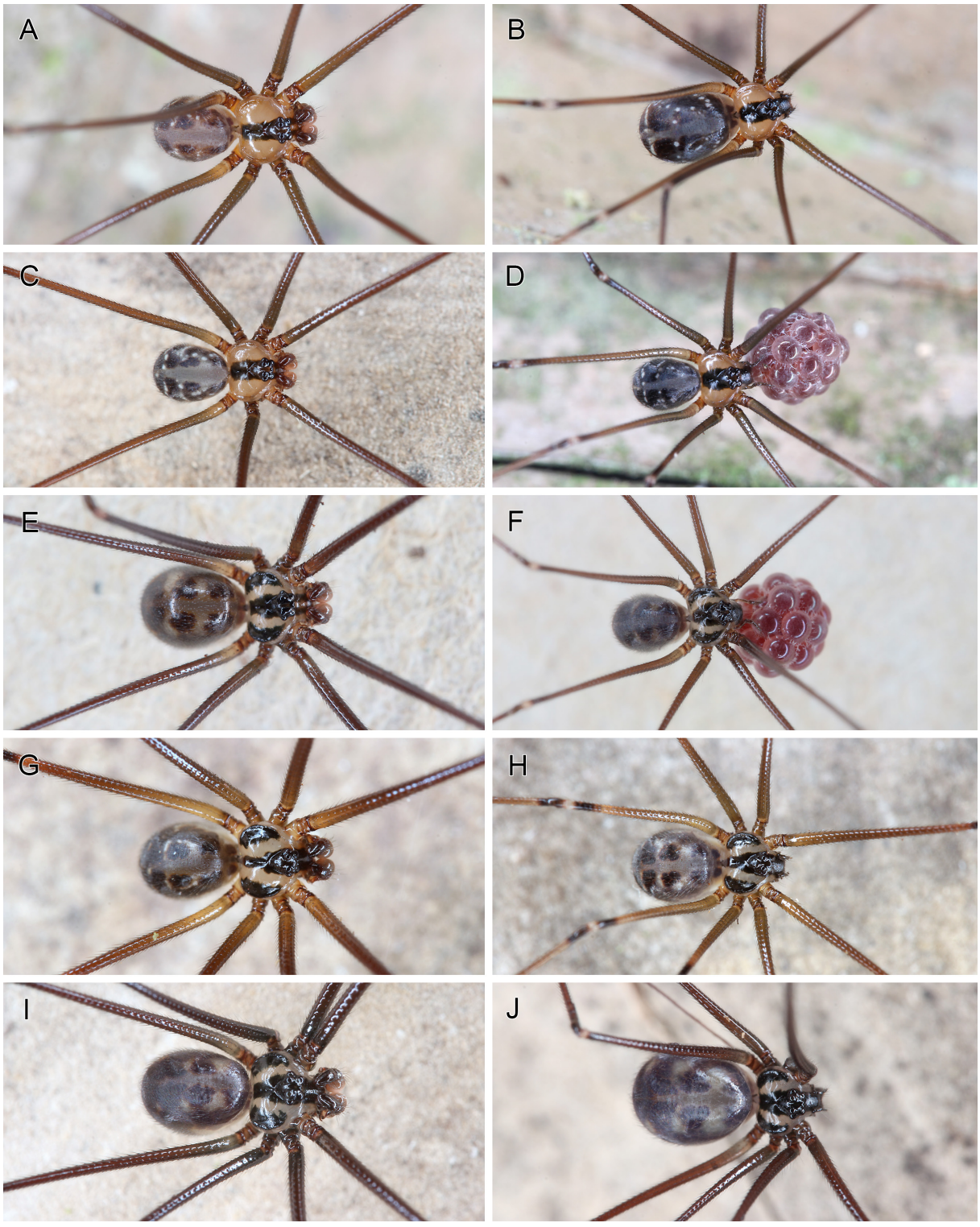

Fig. 2. *Tunda* Huber gen. nov., live specimens. **A–B**. *T. icazai* Huber gen. et sp. nov., ♂ ♀ from Ecuador, Manabí, Jama-Coaque Reserve. **C–D**. *T. pachoca* Huber gen. et sp. nov., ♂ from Ecuador, Manabí, Cascada El Chorrillo, ♀ with egg sac from Manabí, near Cruz de Guanábano. **E–F**. *T. totoro* Huber gen. et sp. nov., ♂ ♀ with egg sac from Colombia, Cauca, Finca El Diviso. **G–H**. *T. muki* Huber gen. et sp. nov., ♂ ♀ from Ecuador, Tungurahua, S of Baños. **I–J**. *T. ayahuma* Huber gen. et sp. nov., ♂ ♀ from Ecuador, Sucumbíos, near La Bonita.

Etymology

The genus name refers to La Tunda, a shapeshifting entity in the mythology of Ecuador and Colombia, resembling a woman who lures people into the forests and keeps them there; gender feminine.

Description

Males

Measurements. Total body length 3.0–4.5; carapace width 1.2–1.8. PME diameter 100–160 µm; AME diameter 30–65 µm. Leg 1 length ~18–50; tibia 1 length ~5–12; leg formula 1243 (legs 2 and 4 subequal); leg femur 2 (or femora 1 and 2) often thicker than other femora. Tibia 1 diameter: 120–185 µm; tibia 1L/d 35–75.

Color. Life spiders mostly ochre to light brown with black marks (Fig. 2). In ethanol mostly ochre-yellow with brown and black marks. Carapace with dark median mark including ocular area, often also with pair of lateral bands. Legs sometimes without or with indistinct dark rings, sometimes with distinct dark rings on femora (subdistally) and tibiae (proximally and subdistally). Abdomen with darker internal marks dorsally and laterally, often bluish in ethanol; ventrally with darker area in front of gonopore (ochre to brown) and rarely also in front of spinnerets, and internal mark (bluish in ethanol) behind gonopore.

Body. Habitus as in Fig. 2. Ocular area raised. Carapace with deep thoracic groove. Clypeus unmodified. Sternum wider than long, unmodified. Abdomen slightly elongated, pointed at spinnerets. Gonopore apparently without epiandrous spigots (studied with light microscope only). Spinnerets as usual in Modisiminae (studied with light microscope only): ALS with only two spigots: one strongly widened spigot and one long and slender spigot; PMS with two short conical spigots; PLS without spigots.

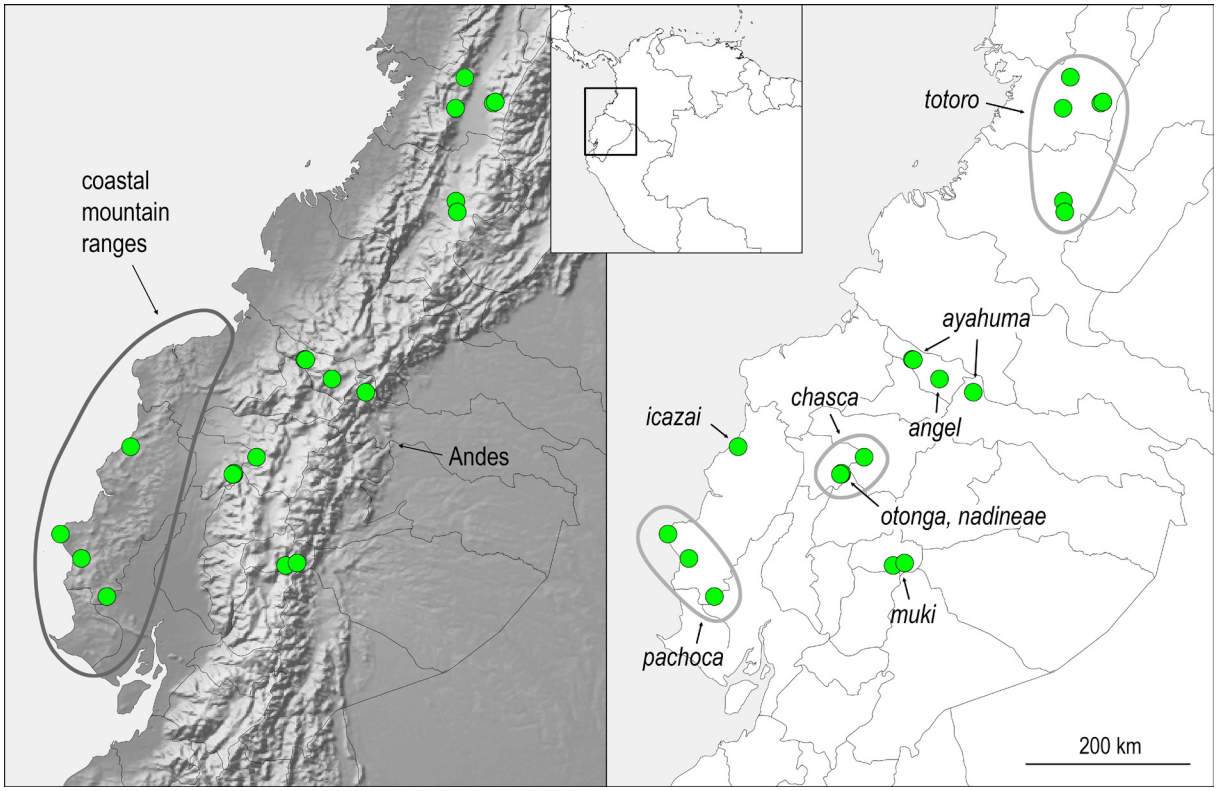

Fig. 3. Known distribution of *Tunda* Huber gen. nov. Left: topographical map showing the two main physical features with species records. Right: distributions of individual species. Inset: map location in northwestern South America.

Chelicerae. With variable number of small frontal apophyses (1–7 on each side). Without stridulatory files.

Palps. Coxa with retrolateral-ventral process; trochanter barely modified; femur proximally with distinct retrolateral-ventral rounded process, distally with strong ventral pointed process directed distally; femur-patella condyles not shifted toward one side; tibia with two trichobothria; tibia-tarsus condyles not or slightly shifted toward retrolateral side but retrolateral condyle very indistinct and poorly visible; tarsus



Fig. 4. *Tunda* Huber gen. nov., typical habitats (type localities, TL). **A**. Ecuador, Manabí, Jama-Coaque Reserve (TL of *T. icazai* Huber gen. et sp. nov.). **B**. Ecuador, Manabí, Pachoca Reserve (TL of *T. pachoca* Huber gen. et sp. nov.). **C**. Colombia, Cauca, Vereda Brisas de Totoro (TL of *T. totoro* Huber gen. et sp. nov.). **D**. Ecuador, Tungurahua, S of Baños (TL of *T. muki* Huber gen. et sp. nov.). **E**. Ecuador, Pichincha, between San Juan and Chiriboga (TL of *T. chasca* Huber gen. et sp. nov.). **F**. Ecuador, Sucumbíos, near La Bonita (TL of *T. ayahuma* Huber gen. et sp. nov.).

with distinct dorsal process; palpal tarsal organ apparently exposed (studied with light microscope only); procursus shape simple and conservative, straight or slightly curved (in dorsal view towards prolateral) (e.g., Figs 6A–C, 28A–C); genital bulb with proximal sclerite connecting genital bulb to tarsus (Fig. 6F); distally with sclerotized and membranous elements, tip with main bulbal apophysis (often serrated or with tiny spikes) and pair of slender processes (processes #1 and #2 in Figs 6E, 12E, 28E) (process #1 sometimes very indistinct, in *T. totoro* gen. et sp. nov. possibly absent); sperm duct opening located between these slender processes (asterisks in Figs 16E, 28E).

Legs. In most species with spines on anterior femora (femur 1 or femora 1 and 2), with numerous short spines (~50–150 μm) and a few long spines (~250–400 μm) (Fig. 19D) (absent in *T. icazai* gen. et sp. nov. and *T. pachoca* gen. et sp. nov.). Often with curved hairs, especially on tibiae and metatarsi, rarely also on femora; strongly curved hairs often limited to metatarsi. With sexually dimorphic short hairs (40–50 μm long) on tibiae. Retrolateral trichobothrium on tibia 1 at 5–8% of tibia length; prolateral trichobothrium present on all tibiae. Without slender metatarsal hairs (as described in Huber *et al.* 2023c). Tarsi with 20–45 pseudosegments, mostly distinct (except proximally).

Females

In general (habitus, coloration), similar to males (Fig. 2), but legs shorter (male / female tibia 1 : ~1.3–1.6) and slenderer (tibia 1 diameter: 110–150 μm), leg femora 1–4 of approximately same thickness and without spines, without sexually dimorphic short hairs, sometimes with slightly different coloration of clypeus, sternum, and abdomen ventrally. Several species with a unique type of female stridulatory organ composed of a row of modified hair-bases on femur 4 and a narrow band (two parallel rows) of modified hair bases laterally on the abdomen (Figs 14, 18, 22) (absent in *T. chasca* gen. et sp. nov., *T. ayahuma* gen. et sp. nov., and *T. angel* gen. et sp. nov.). Epigynum anterior plate highly variable in shape (Fig. 35), without pockets but sometimes with distinctive processes. Posterior epigynal plate usually distinct, wide and short (e.g., Fig. 10A–B), very indistinct in *T. nadineae* gen. et sp. nov. (Fig. 14A–B). Internal genitalia often with simple median anterior 'receptacle' (e.g., Figs 7C, 25C, 29C; function unknown), sometimes indistinct and possibly absent (e.g., in *T. totoro* gen. et sp. nov.); in some species with distinctive pair of membranous lateral sacs (Figs 13C, 17C, 21C, 25C); with distinct pore plates that are either separate (e.g., Figs 21C, 29C), in contact medially (Figs 13C, 17C) or completely fused (Figs 7C, 9C).

Relationships

Morphologically, the monophyly of *Tunda* gen. nov. is supported by the unique pair of slender processes distally on the male genital bulb. In addition, molecular data (from low coverage genome sequencing) strongly support the monophyly of the four species included in that dataset (*T. chasca* gen. et sp. nov., *T. icazai* gen. et sp. nov., *T. muki* gen. et sp. nov., *T. totoro* gen. et sp. nov.) (G. Meng, L. Podsiadlowski, B.A. Huber, unpubl. data). Relationships among these four species and to other genera are highly variable among different types of analyses. Most analyses suggest a close relationship with other genera that share a ventral apophysis on the male palpal femur that is directed distally (e.g., *Anopsicus* Chamberlin & Ivie, 1938; *Modisimus* Simon, 1893; *Psilochorus* Simon, 1893; *Lyleka* Huber, 2026). Within *Tunda*, *CO1* sequences (Fig. 1) and morphology (see Diagnoses) suggest a close relationship between *T. icazai* and *T. pachoca* gen. et sp. nov. (these two species also share the ecosystem, the Pacific Equatorial Forest), and among *T. chasca*, *T. ayahuma* gen. et sp. nov., and *T. angel* gen. et sp. nov.; beyond that, relationships remain obscure.

Distribution

The genus is known from the Andes of Ecuador (western and eastern slopes) and southern Colombia, and from the coastal mountain ranges of western Ecuador (Fig. 3).

Natural history

Most species were found in dark, sheltered cavities or holes in the ground or at ground level in well-preserved humid forests (Fig. 4), often with the webs visible from outside while the spider was hidden deep inside the hole. This microhabitat was often shared with representatives of *Priscula* Simon, 1893 and the two genera were thus found in close proximity to each other. *Tunda pachoca* gen. et sp. nov. was also found in decaying bamboo tubes lying on the ground. At most localities, only a single species of *Tunda* gen. nov. was found. A remarkable exception was Otonga Nature Reserve near San Francisco de Las Pampas (Ecuador), where three species co-occurred; one of them seems to have been collected from an unusual microhabitat, as suggested by label data ("beating branches", "beating trees"; see *T. nadineae* gen. et sp. nov.). Upon disturbance, the spiders retreated even deeper into the holes and were difficult to access. No whirling or vibrating behavior was observed. The webs consisted of domed sheets with a diameter of 20–30 cm, with a tangle of supporting lines above the sheet; in some cases, the domed sheet appeared to extend posteriorly into a tube at the back of the hole, leading into a small crevice.

Composition

The genus includes the nine species newly described below. No further species available in collections are known to us.

Identification

In contrast to most known pholcids, species of *Tunda* gen. nov. tend to be more easily distinguished on the basis of females rather than males (similar to *Lyleka* Huber, 2026). This is particularly true for the three species lacking a female stridulatory apparatus (*T. chasca* gen. et sp. nov., *T. ayahuma* gen. et sp. nov., *T. angel* gen. et sp. nov.), which have apparently identical male chelicerae and palps, whereas the female epigyna and internal genitalia are diagnostic for each species (Fig. 35). Most other species are also diagnosable using the male chelicerae, but the male palps (in particular the procursi) offer very little diagnostic information and have a simple shape that is strongly dependent on the exact angle of view. We thus selected females as holotypes, rather than males as is usual in Pholcidae.

Tunda icazai Huber gen. et sp. nov.

urn:lsid:zoobank.org:act:74281C61-2357-4E4D-B0FD-5E1C32F4A68C

Figs 2A–B, 5–8

Diagnosis

Easily distinguished from most known congeners (except *T. pachoca* gen. et sp. nov.) by armature of male chelicerae (Fig. 7A–B; 5–7 small apophyses on each side; other species with only 1–3 on each side), by absence of spines on male anterior femora, and by shape of epigynal plate (Fig. 8A–B; roughly rectangular, wider than long, with ventral rounded process). Distinguished from *T. pachoca* by absence of proximal ridge on male chelicerae (cf. Fig. 9A) and by ventral epigynal process in more posterior position (compare Figs 8B and 10B). From most other congeners (except *T. nadineae* gen. et sp. nov.) also distinguished by absence of distinct lateral marks on carapace (Fig. 2A–B).

Etymology

The species is named for the Ecuadorian writer Jorge Icaza (1906–1978), author of the novel *Huasipungo* that brought attention to the exploitation of Ecuador's indigenous people.

Type material

Holotype

ECUADOR – **Manabí** • ♀; SW of Pedernales, Jama-Coaque Reserve; 0.119° S, 80.124° W; 400 m a.s.l.; 17 Sep. 2021; B.A. Huber and M. Herrera leg.; INABIO MECN-AR 1503.

Paratypes

ECUADOR – **Manabí** • 2 ♂♂, 1 ♀; same collection data as for holotype; INABIO MECN-AR 1504 • 3 ♂♂, 2 ♀♀; same collection data as for holotype; ZFMK Ar 24771.

Other material examined

ECUADOR – **Manabí** • 3 ♀♀ (one prosoma used for sequencing; one abdomen cleared and transferred to ZFMK Ar 24771), 3 juvs, in pure ethanol; same collection data as for holotype; ZFMK Ecu130 (voucher of EB048, G33).

Description

Male (paratype, ZFMK 24771)

Measurements. Total body length 3.4, carapace width 1.6. Distance PME–PME 150 µm; diameter PME 145 µm; distance PME–ALE 140 µm; distance AME–AME 30 µm; diameter AME 45 µm. Leg 1: 43.9 (11.2+0.7+11.2+18.5+2.3), tibia 2: 7.6, tibia 3: 5.7, tibia 4: 7.6; tibia 1 L/d: 72; leg femora 1–3 slightly thicker than femur 4 (0.24–0.26 vs 0.22); diameters of leg tibiae 0.14–0.16.

Color (in ethanol). Prosoma pale ochre-yellow with wide dark brown median band including ocular area and clypeus, on clypeus medially divided by light area, without dark lateral bands; sternum ochre-orange, with median darker brown band widening anteriorly; legs brown, tips of femora and tibiae lighter, without darker rings; abdomen pale bluish with dark bluish internal marks dorsally and laterally, ventrally with orange-brown plate in front of gonopore, indistinct orange plate in front of spinnerets, and small bluish internal mark behind gonopore.

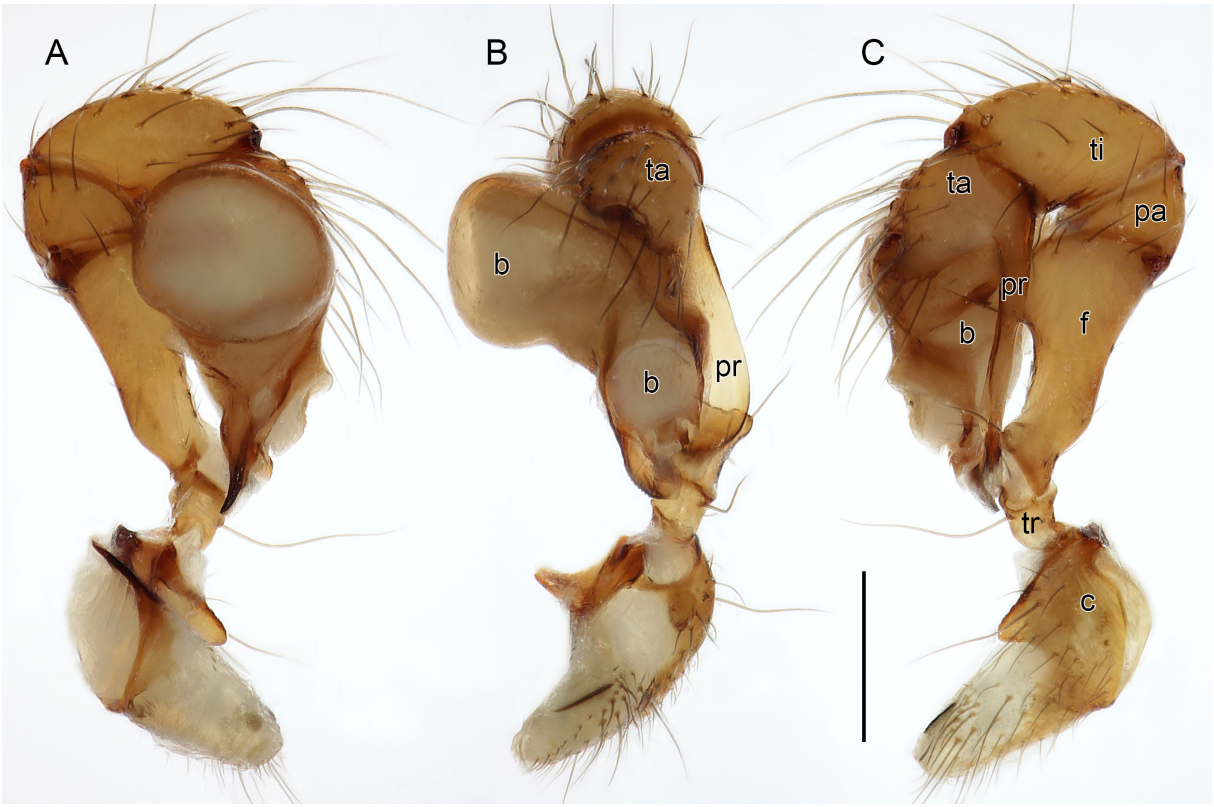

Fig. 5. *Tunda icazai* Huber gen. et sp. nov., paratype, ♂, from Ecuador, Manabí, Jama-Coaque Reserve, ZFMK Ar 24771. Left palp, prolateral, dorsal and retrolateral views. Abbreviations: b = genital bulb; c = coxa; f = femur; pa = patella; pr = procursus; ta = tarsus; ti = tibia; tr = trochanter. Scale line = 0.3 mm.

Body. Habitus as in Fig. 2A. Ocular area raised. Carapace with deep thoracic groove. Clypeus unmodified. Sternum wider than long (1.0/0.7), unmodified. Abdomen barely longer than high, pointed at spinnerets.

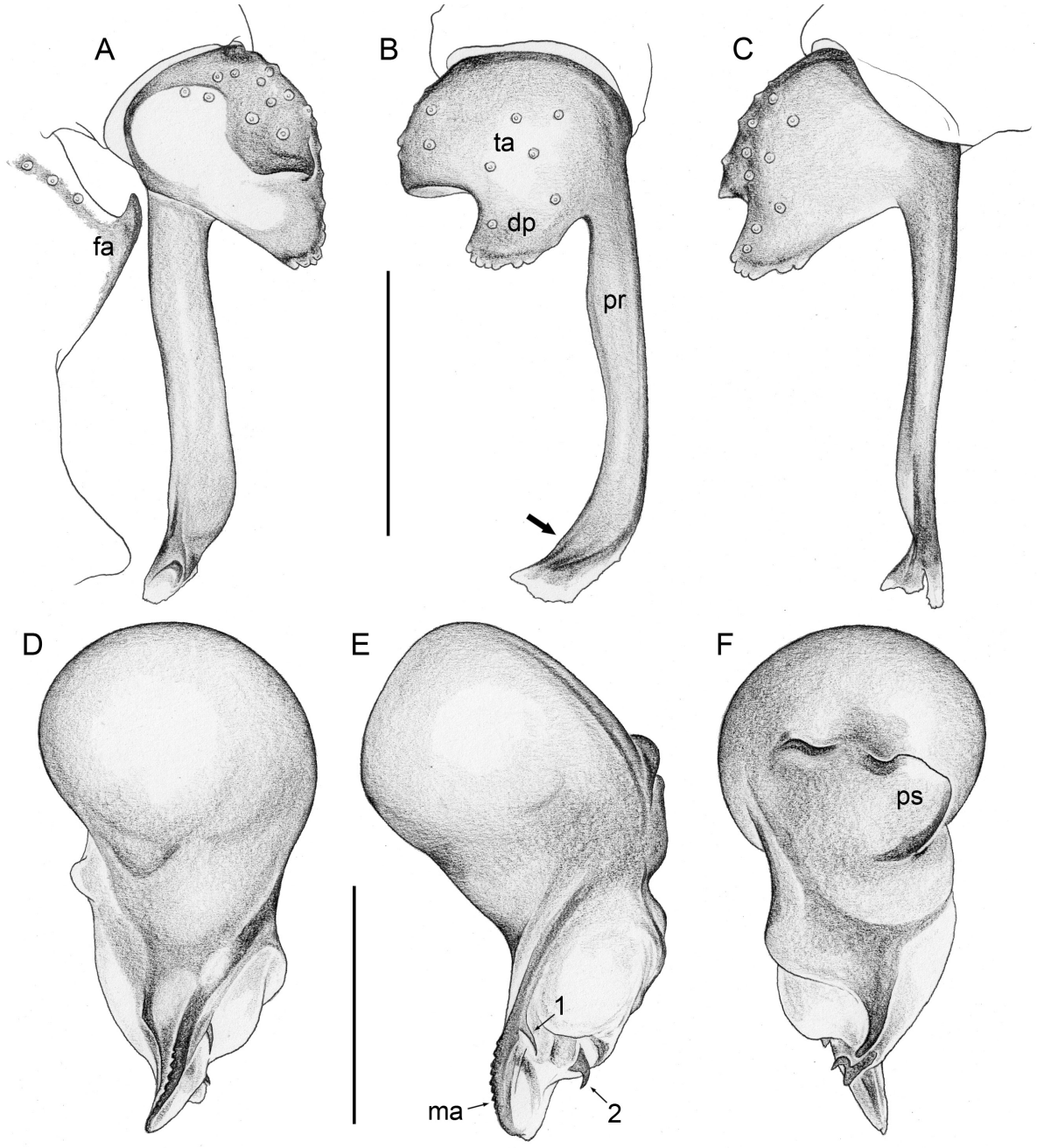

Fig. 6. *Tunda icazai* Huber gen. et sp. nov., paratype, ♂, from Ecuador, Manabí, Jama-Coaque Reserve, ZFMK Ar 24771. **A–C**. Left palpal tarsus and procursus (in A with parts of femur) in prolateral, dorsal and retrolateral views; bold arrow in B points at distal part of procursus that is slightly larger in *T. pachoca* gen. et sp. nov. **D–F**. Left genital bulb in prolateral, dorsal and retrolateral views; "1" and "2" denote slender bulbal processes. Abbreviations: dp = dorsal process of tarsus; fa = ventral femur apophysis; ma = main distal apophysis of genital bulb; pr = procursus; ps = proximal sclerite connecting genital bulb to tarsus; ta = tarsus. Scale lines = 0.3 mm.

Chelicerae. As in Fig. 7A–B; with curved row of 6–7 small apophyses on each side.

Palps. As in Fig. 5; coxa with rounded retrolateral-ventral process; trochanter unmodified; femur proximally with distinct retrolateral-ventral process, distally widened, with strong ventral apophysis directed distally (Fig. 6A); femur-patella condyles not shifted toward one side; tibia-tarsus condyles indistinct, apparently not shifted to one side; tarsus with large dorsal process; procursus (Fig. 6A–C) proximally simple, almost same width throughout, distally curved toward prolateral, tip with simple sclerotized and membranous elements; genital bulb (Fig. 6D–F) distally with serrated main apophysis and two slender processes on prolateral and dorsal sides, respectively.

Legs. Without spines; with strongly curved hairs on tibiae and metatarsi 1–3; with short sexually dimorphic hairs dorsally on tibiae; retrolateral trichobothrium of tibia 1 at 5%; prolateral trichobothrium present on all tibiae; tarsus 1 with ~30 pseudosegments, mostly distinct (except proximally).

Female (holotype)

In general (habitus, color pattern) similar to male (Fig. 2B), but tibia 1 without sexually dimorphic short hairs, with stridulatory organ between femur 4 (row of ~14 modified hair bases proximally) and abdomen (~24 modified hair bases in two rows, laterally above book lung covers). Total body length 3.0, carapace width 1.3. Distance PME–PME 110 µm; diameter PME 120 µm; distance PME–ALE 120 µm; distance AME–AME 25 µm; diameter AME 40 µm. Leg 1: 27.1 (6.8+0.4+6.6+11.2+2.1), tibia 2: 4.2, tibia 3: 3.3, tibia 4: 4.4; tibia 1 L/d: 55. Epigynum (Fig. 8A–B) anterior plate protruding, with distinctive rounded process near posterior margin, lateral sclerotized margins separated from central part of plate by pair of whitish areas; posterior epigynal plate short and simple, mostly hidden by anterior plate in ventral view. Internal genitalia (Figs 7C, 8C–D) with distinctively fused, large, and sclerotized pore plates, most pores laterally; with membranous anterior structures including 'receptacle', without pair of oval sacs near lateral corners.

Variation

Tibia 1 in five males: 9.4–11.2 (mean 10.4); in six females: 6.4–7.2 (mean 6.8). Some specimens in general lighter. Number of apophyses on male chelicerae variable (5–7 on each side), apparently not

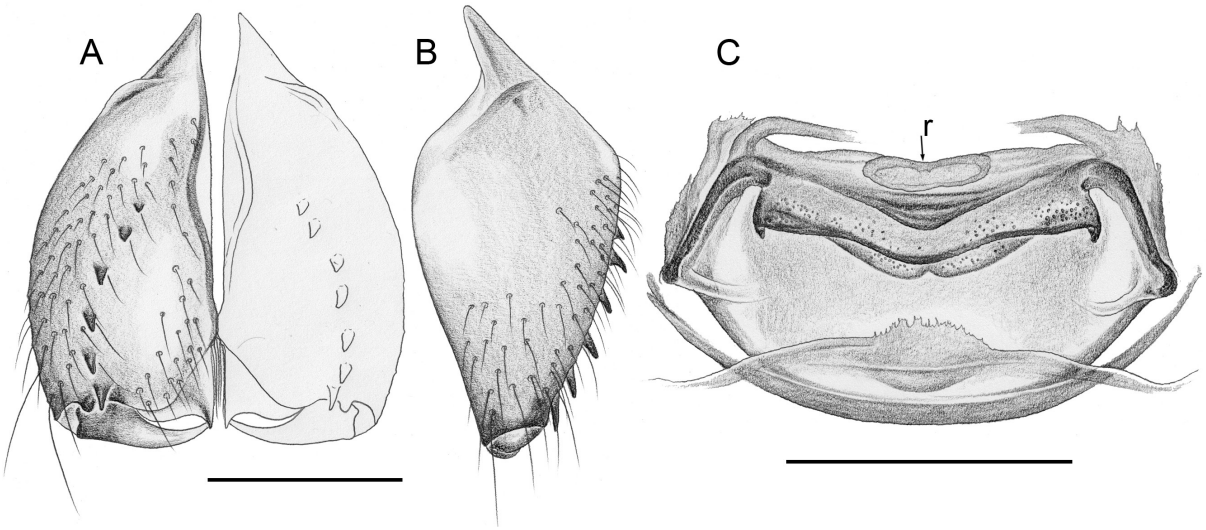

Fig. 7. *Tunda icazai* Huber gen. et sp. nov., paratypes, ♂♀, from Ecuador, Manabí, Jama-Coaque Reserve, ZFMK Ar 24771. **A–B**. Male chelicerae, frontal and lateral views. **C**. Cleared female genitalia, dorsal view. Abbreviation: r = putative receptacle. Scale lines = 0.3 mm.

related to size. Indistinct plate in front of spinnerets also present in smallest male. Anterior epigynal plate variably protruding.

Barcoding

We sequenced one specimen from the type locality (Table 1). The NJ tree (Fig. 1) supports a close relationship with *T. pachoca* gen. et sp. nov. (K2P distances: 12.4–13.0%), which agrees with the morphological similarities shared by the two species (see Diagnosis above) and with the shared ecosystem (Pacific Equatorial Forest).

Distribution

Known from type locality only, situated in the Pacific Equatorial Forest of coastal Ecuador (Fig. 3).

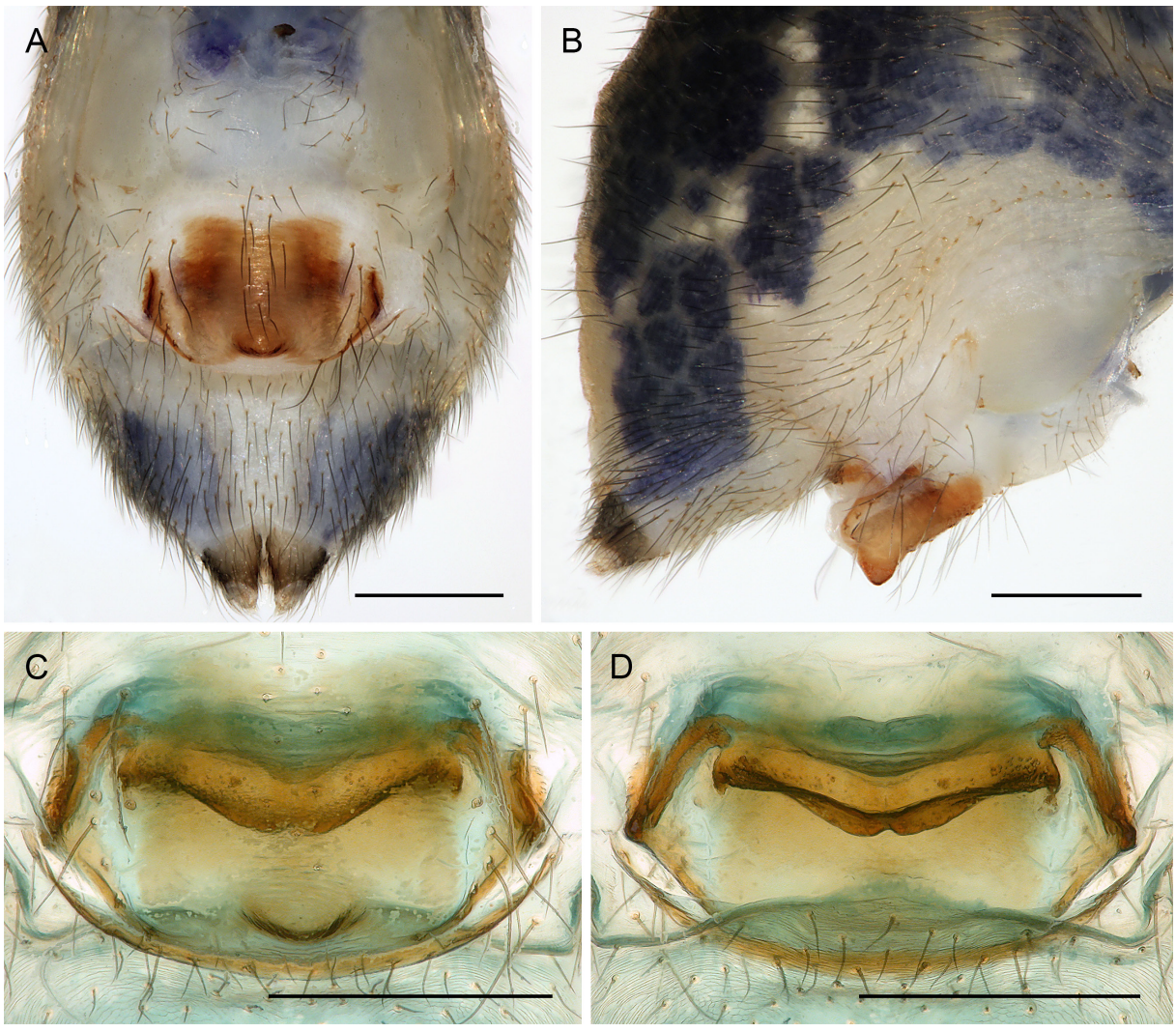

Fig. 8. *Tunda icazai* Huber gen. et sp. nov., paratype, ♀, from Ecuador, Manabí, Jama-Coaque Reserve, ZFMK Ar 24771. **A–B**. Abdomen, ventral and lateral views. **C–D**. Cleared genitalia, ventral and dorsal views. Scale lines = 0.3 mm.

Natural history

At the type locality, the spiders were abundant in cavities at ground level in a humid forest near the river (Fig. 4A). Their webs had a diameter of ~30 cm. Upon disturbance, the spiders quickly retreated towards the back.

Tunda pachoca Huber gen. et sp. nov.
urn:lsid:zoobank.org:act:E623C826-F852-468C-B499-25D071CD6BD9
Figs 2C–D, 9–10

Diagnosis

Easily distinguished from most known congeners (except *T. icazai* gen. et sp. nov.) by armature of male chelicerae (Fig. 9A–B; 6–7 small apophyses on each side; other species with only 1–3 on each side), by absence of spines on male anterior femora, and by shape of epigynal plate (Fig. 10A–B; roughly rectangular, wider than long, with ventral rounded process). Distinguished from *T. icazai* by strong proximal ridge on male chelicerae (arrow in Fig. 9A) and by ventral epigynal process in more anterior position (compare Figs 8B and 10B). From most other congeners (except *T. nadineae* gen. et sp. nov.) also distinguished by absence of distinct lateral marks on carapace (Fig. 2C–D).

Etymology

The species name is derived from the type locality, noun in apposition.

Type material

Holotype

ECUADOR – **Manabí** • ♀; near San Lorenzo, Pachoca Reserve; 1.070° S, 80.890° W; 150–200 m a.s.l.; 18 Sep. 2021; B.A. Huber and M. Herrera leg.; humid forest; INABIO MECN-AR 1505.

Paratypes

ECUADOR – **Manabí** • 4 ♂♂, 4 ♀♀; same collection data as for holotype; INABIO MECN-AR 1506, MECN-AR 1507 • 5 ♂♂, 4 ♀♀; same collection data as for holotype; ZFMK Ar 24772.

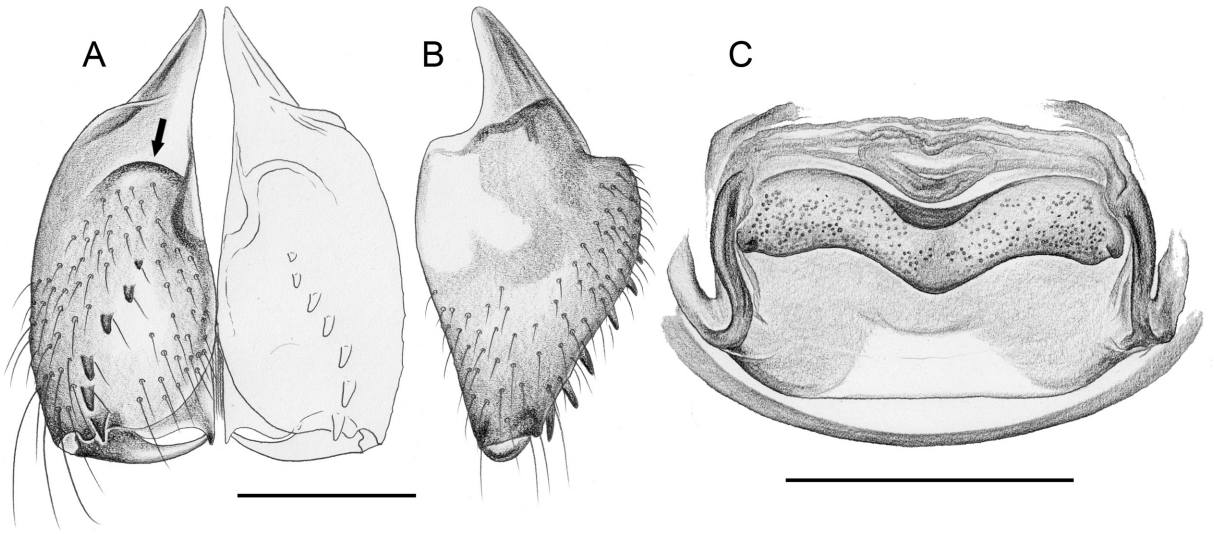

Fig. 9. *Tunda pachoca* Huber gen. et sp. nov., paratypes, ♂♀, from Ecuador, Manabí, Pachoca Reserve, ZFMK Ar 24772. **A–B**. Male chelicerae, frontal and lateral views; arrow points at distinctive proximal ridge. **C**. Cleared female genitalia, dorsal view. Scale lines = 0.3 mm.

Other material examined

ECUADOR – **Manabí** • 3 ♂♂, 5 ♀♀ (one female abdomen cleared and transferred to ZFMK Ar 24772), 1 juv., in pure ethanol; same collection data as for holotype; ZFMK Ecu137 (voucher of EB055) • 2 ♂♂, 2 ♀♀; between Puerto Cayo and Jipijapa, above Cascada El Chorrillo; 1.3370° S, 80.6593° W; 490 m a.s.l.; 19 Sep. 2021; B.A. Huber and M. Herrera leg.; humid forest; INABIO MECN-AR 1508 • 4 ♂♂, 5 ♀♀, 3 juvs; same collection data as for preceding; ZFMK Ar 24773 • 2 ♀♀, 3 juvs, in pure ethanol; same collection data as for preceding; ZFMK Ecu141 (voucher of EB058) • 2 ♂♂, 1 ♀; near Cruz de Guanábano; 1.7519° S, 80.3820° W; 140 m a.s.l.; 20 Sep. 2021; B.A. Huber and M. Herrera leg.; forest near river; ZFMK Ar 24774 • 1 ♀, 1 juv., in pure ethanol; same collection data as for preceding; ZFMK Ecu144 (voucher of EB061).

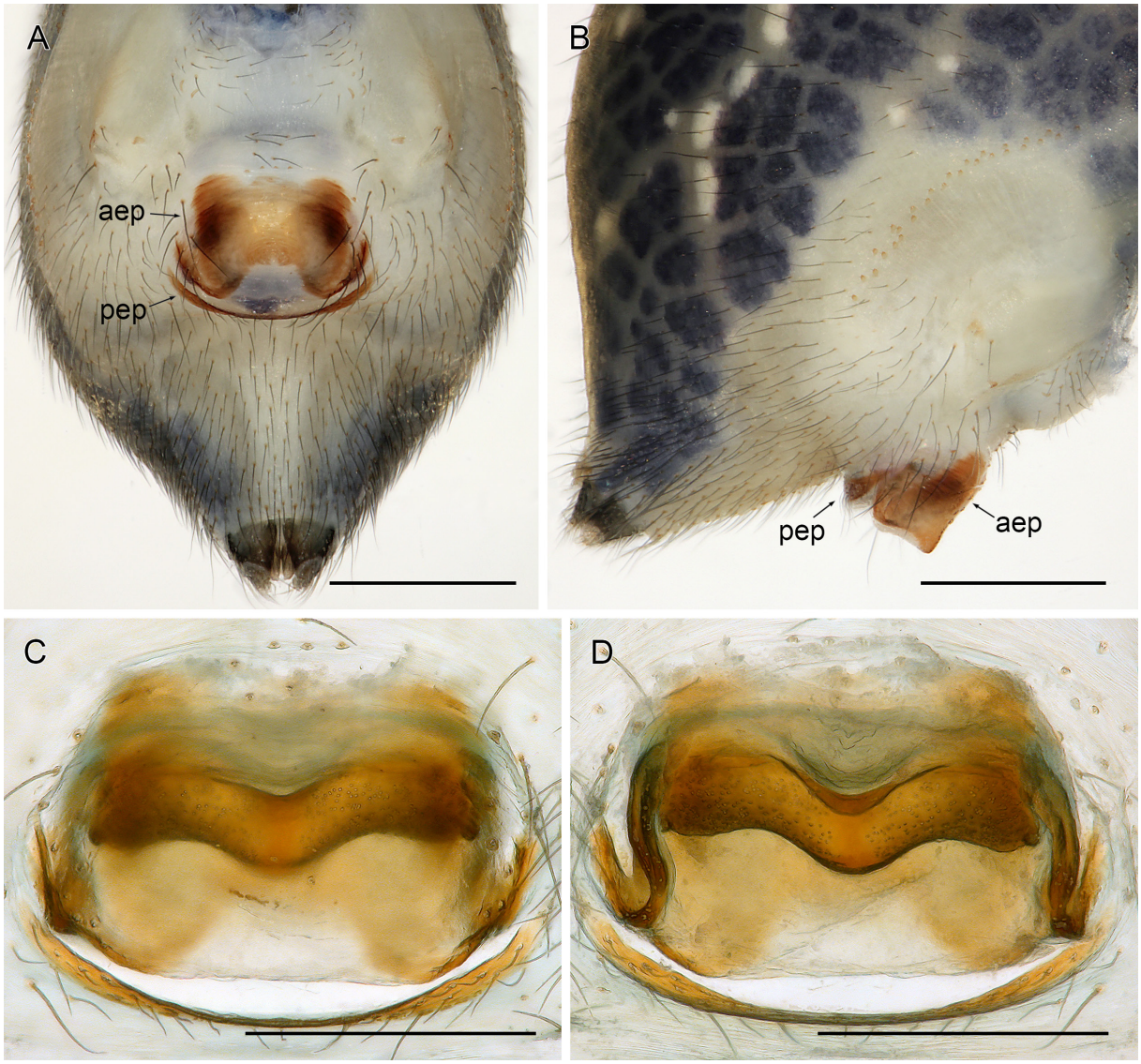

Fig. 10. *Tunda pachoca* Huber gen. et sp. nov., paratype, ♀, from Ecuador, Manabí, Pachoca Reserve, ZFMK Ar 24772. **A–B**. Abdomen, ventral and lateral views. **C–D**. Cleared genitalia, ventral and dorsal views. Abbreviations: aep = anterior epigynal plate, pep = posterior epigynal plate. Scale lines: A–B = 0.5 mm; C–D = 0.3 mm.

Description

Male (paratype, ZFMK 24772)

Measurements. Total body length 3.2, carapace width 1.5. Distance PME–PME 160 µm; diameter PME 140 µm; distance PME–ALE 140 µm; distance AME–AME 30 µm; diameter AME 50 µm. Leg 1: 39.6 (9.6+0.7+9.8+17.0+2.5), tibia 2: 6.5, tibia 3: 5.0, tibia 4: 6.3; tibia 1 L/d: 65; diameters of leg femora 0.25–0.27; diameters of leg tibiae 0.14–0.15.

Color (in ethanol). Prosoma pale ochre-yellow with wide dark brown median band including ocular area and clypeus, on clypeus medially divided by light area, without dark lateral bands; sternum ochre-orange, with median darker brown band widening anteriorly; legs brown, tips of femora and tibiae lighter, without darker rings; abdomen pale bluish with dark bluish internal marks dorsally and laterally, ventrally with orange-brown plate in front of gonopore, indistinct orange plate in front of spinnerets, and small bluish internal mark behind gonopore.

Body. Habitus as in Fig. 2C. Ocular area raised. Carapace with deep thoracic groove. Clypeus unmodified. Sternum wider than long (1.0/0.7), unmodified. Abdomen barely longer than high, pointed at spinnerets.

Chelicerae. As in Fig. 9A–B; with distinctive proximal frontal ridge and with curved row of 6–7 small apophyses on each side.

Palps. Mostly indistinguishable from *T. icazai* gen. et sp. nov. (cf. Fig. 5); very indistinct differences in tip of procursus (bold arrow in Fig. 6B) and main apophysis of genital bulb (ma in Fig. 6E).

Legs. Without spines; with strongly curved hairs on tibiae 1–4 and metatarsi 1–3; with short sexually dimorphic hairs dorsally on tibiae; retrolateral trichobothrium of tibia 1 at 5%; prolateral trichobothrium present on all tibiae; tarsus 1 with ~25 pseudosegments, mostly distinct (except proximally).

Female (holotype)

In general (habitus, color pattern) similar to male (Fig. 2D), but tibia 1 without sexually dimorphic short hairs, with stridulatory organ between femur 4 (row of ~15 modified hair bases proximally) and abdomen (~26 modified hair bases in two rows, laterally above book lung covers). Total body length 2.8, carapace width 1.2. Distance PME–PME 130 µm; diameter PME 130 µm; distance PME–ALE 130 µm; distance AME–AME 20 µm; diameter AME 30 µm. Leg 1: 24.4 (6.1+0.5+6.1+9.9+1.8), tibia 2: 3.9, tibia 3: 3.0, tibia 4: 4.1; tibia 1 L/d: 51. Epigynum (Fig. 10A–B) anterior plate variably protruding, with deep whitish posterior indentation and rounded process in central position, lateral sclerotized margins separated from central part of plate by pair of whitish areas; posterior epigynal plate short and simple. Internal genitalia (Figs 9C, 10C–D) with distinctively fused, large, and sclerotized pore plates, most pores laterally; with membranous anterior structures including indistinct ‘receptacle’, without pair of oval sacs near lateral corners.

Variation

Tibia 1 in 18 males: 6.8–9.9 (mean 9.0); males from near Cruz de Guanábano with shortest legs (6.8–8.3; others: 8.5–9.9). Tibia 1 in 19 females: 4.9–6.5 (mean 5.8); female from near Cruz de Guanábano with shortest legs (4.9; others: 5.4–6.5). Some specimens in general lighter. Clypeus light median area sometimes restricted to small mark below AME. Number of apophyses on male chelicerae variable (5–7 on each side), apparently not related to size. Indistinct plate in front of spinnerets also present in smallest males.

Barcoding

We sequenced three specimens from three localities (Table 1). Intraspecific distances ranged from 2.5 to 3.1% (Table 2). The NJ tree (Fig. 1) supports a close relationship with *T. icazai* gen. et sp. nov. (see Barcoding section of *T. icazai* above).

Distribution

Known from three localities in the Pacific Equatorial Forest of coastal Ecuador (Fig. 3).

Natural history

At the type locality, the spiders were found both in decaying bamboo culms lying on the ground and in large dark spaces and cavities in a humid forest along the river (Fig. 4B). Their domed webs often transformed towards the back into distinct tubes, leading deeper into small crevices that were difficult to access.

Tunda nadineae Huber gen. et sp. nov.

urn:lsid:zoobank.org:act:1011D184-0F14-4AFC-B518-F70840A35282

Figs 11–14

Diagnosis

Easily distinguished from known congeners by unique pair of lateral posterior processes on anterior epigynal plate (arrows in Fig. 14A–B). From most congeners (except *T. chasca* gen. et sp. nov., *T. ayahuma* gen. et sp. nov., *T. angel* gen. et sp. nov.) also by male chelicerae with single pair of anterior apophyses in central position (Fig. 13A; in other species in distal position or with more than one pair of apophyses). From *T. chasca*, *T. ayahuma*, *T. angel* also distinguished by presence of female stridulatory organ (abdomen-femur 4; Fig. 14) and by absence of distinct lateral marks on carapace.

Etymology

The species is named for Nadine Dupérré, who has contributed tremendously to our knowledge about Ecuadorian spiders and who kindly allowed access to the Pholcidae in her collections.

Type material

Holotype

ECUADOR – **Cotopaxi** • ♀; Otonga Nature Reserve; 0.4197° S, 78.9971° W; 1760 m a.s.l.; 8 Dec. 2009; P. Michalik leg.; INABIO MECN-AR 1499.

Paratypes

ECUADOR – **Cotopaxi** • 1 ♂; same collection data as for holotype, together with holotype; INABIO MECN-AR 1499 • 1 ♂, 6 ♀♀; same collection data as for holotype; ZFMK Ar 24763.

Other material examined

ECUADOR – **Cotopaxi** • 1 ♂, in pure ethanol; same collection data as for holotype; ZFMK Mich37 (voucher of EB138) • 1 ♂, in pure ethanol; same collection data as for holotype; ZFMK Mich39 • 5 ♂♂, 1 ♀; Otonga Nature Reserve; 0.4199° S, 79.0062° W; 2000 m a.s.l.; 24–30 May 2014; N. Dupérré, E.E. Tapia and C.A. Tapia leg.; QCAZI 278757 (Dup050; voucher of EB010) • 1 ♀; same collection data as for preceding; QCAZI 278758 • 1 ♂; same collection data as for preceding but 13 Nov. 2014; QCAZI 278759 • 1 ♀; same collection data as for preceding; ZFMK Ar 24764 • 1 ♀; same collection data as for preceding but 12 Nov. 2014; QCAZI 278760 • 1 ♂; same collection data as for preceding but 5–7 Sep. 2014; QCAZI 278761. – **Santo Domingo** • 6 ♂♂, 2 ♀♀; Otonga Nature Reserve; 0.4086° S, 78.9968° W; 1580 m a.s.l.; 4–7 Sep. 2014; N. Dupérré, E.E. Tapia and C.A. Tapia leg.; QCAZI 278762 • 1 ♂, 1 ♀; same collection data as for preceding; ZFMK Ar 24765.

Description

Male (ZFMK 24765)

Measurements. Total body length 3.0, carapace width 1.35. Distance PME–PME 140 µm; diameter PME 130 µm; distance PME–ALE 120 µm; distance AME–AME 15 µm; diameter AME 35 µm. Leg 1: 42.0 (10.1+0.5+9.8+18.5+3.1), tibia 2: 6.5, tibia 3: 5.1, tibia 4: 6.1; tibia 1 L/d: 73; leg femur 3 slightly thinner than others (0.18 vs 0.19–0.20); diameters of leg tibiae 0.13–0.14.

Color (in ethanol). Prosoma pale ochre-yellow with wide dark brown median band including ocular area and clypeus, without (or barely visible) lateral bands; sternum monochromous light brown; legs light brown, tips of femora and tibiae lighter, with very indistinct darker rings subdistally on femora and tibiae; abdomen pale bluish-gray with darker bluish internal marks dorsally and laterally, ventrally with brown plate in front of gonopore.

Body. Habitus similar to *T. pachoca* gen. et sp. nov. and *T. icazai* gen. et sp. nov. (cf. Fig. 2A, C). Ocular area raised. Carapace with deep thoracic groove. Clypeus unmodified. Sternum wider than long (0.95/0.60), unmodified. Abdomen barely longer than high, pointed at spinnerets.

Chelicerae. As in Fig. 13A–B; with pair of frontal apophyses and indistinct frontal lighter area; width of chelicerae: 0.61; distance between tips of apophyses: 0.34.

Palps. As in Fig. 11; coxa with rounded retrolateral-ventral process; trochanter unmodified; femur proximally with small conical retrolateral-ventral process, distally widened, with strong ventral apophysis directed distally (Fig. 12A); femur-patella condyles not shifted toward one side; tibia-tarsus condyles slightly shifted toward retrolateral side; tarsus with large dorsal process; procursus (Fig. 12A–



Fig. 11. *Tunda nadineae* Huber gen. et sp. nov., ♂, from Ecuador, Cotopaxi, Otonga Nature Reserve, ZFMK Mich37. Left palp in prolateral, dorsal and retrolateral views. Scale line = 0.3 mm.

C) proximally simple, same width throughout in lateral view, narrow in retrolateral-dorsal view, distally curved toward prolateral, tip with simple sclerotized and membranous elements; genital bulb (Fig. 12D–F) distally with strong main apophysis provided with small teeth and two slender processes on prolateral and dorsal sides, respectively.

Legs. With spines on femora 1 and 2: femur 1 with 3–4 long spines and ~15 short spines (count approximate because proximally the spines gradually become normal hairs); femur 2 with 1 long and

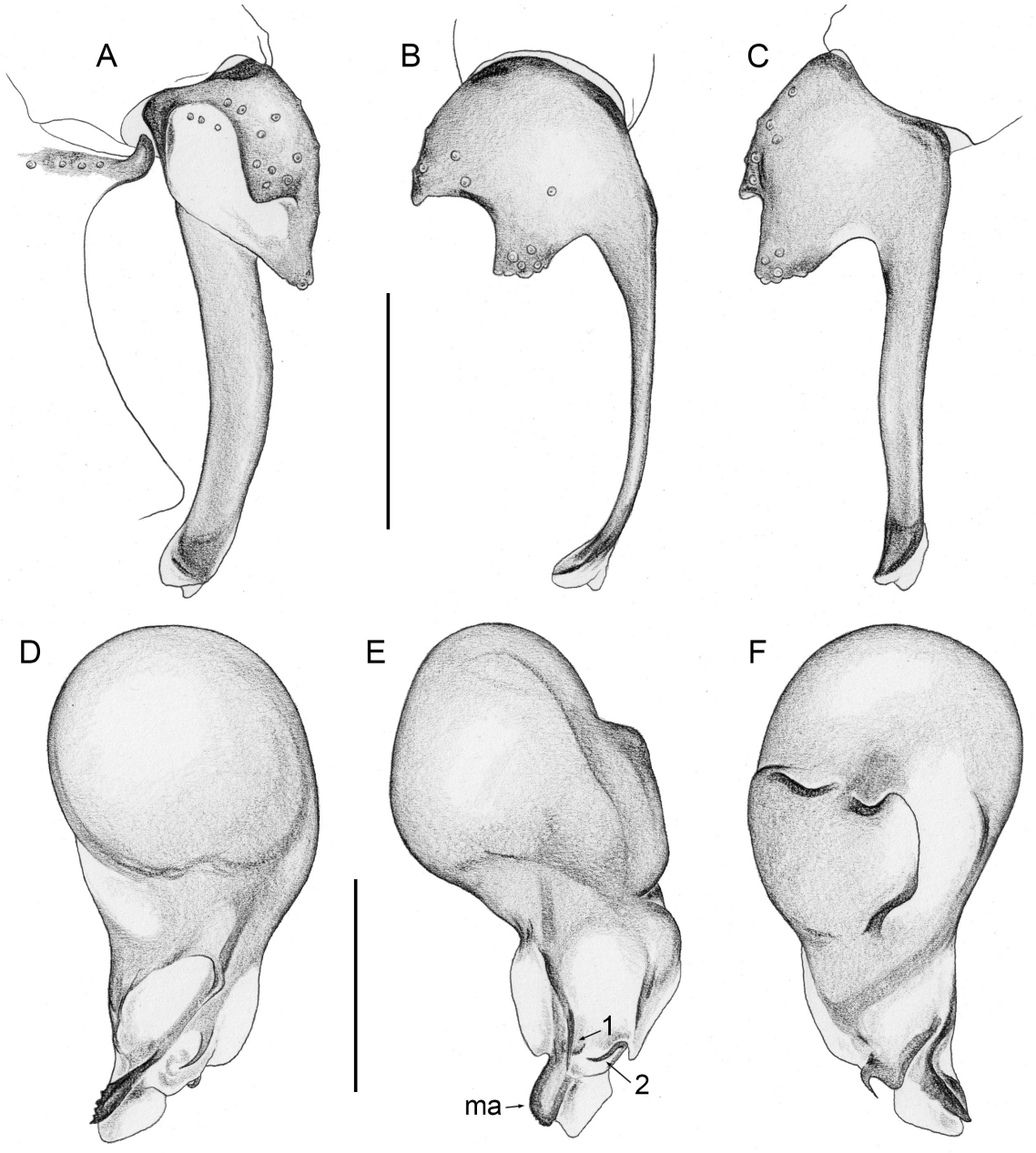

Fig. 12. *Tunda nadineae* Huber gen. et sp. nov., ♂, from Ecuador, Santo Domingo, Otonga Nature Reserve, ZFMK Ar 24765. **A–C**. Left palpal tarsus and procursus (in A with parts of femur) in prolateral, dorsal and retrolateral views. **D–F**. Left genital bulb in prolateral, dorsal and retrolateral views; "1" and "2" denote slender bulbal processes. Abbreviation: ma = main distal apophysis of genital bulb. Scale lines = 0.3 mm.

~5 short spines; spines restricted to distal halves of leg segments; with strongly curved hairs on metatarsi 1–2, weakly curved hairs on tibiae 1–2; with short vertical hairs in low densities on all leg segments, especially dorsally on tibiae, but in barely higher density than in females; retrolateral trichobothrium of tibia 1 at 5%; prolateral trichobothrium present on all tibiae; tarsus 1 with ~40 pseudosegments, mostly distinct (except proximally).

Female (holotype)

In general (habitus, color pattern) similar to male, but leg femora without spines and with slightly fewer short vertical hairs on legs, with stridulatory organ between femur 4 (Fig. 14E; row of modified hair bases proximally) and abdomen (Fig. 14B, F; ~28 modified hair bases in two rows, laterally near book lung covers). Total body length 3.1, carapace width 1.25. Distance PME–PME 110 µm; diameter PME 120 µm; distance PME–ALE 130 µm; distance AME–AME 20 µm; diameter AME 30 µm. Leg 1: 29.5 (7.1 + 0.4 + 6.9 + 12.6 + 2.5), tibia 2: 4.6, tibia 3: 3.5, tibia 4: 4.5; tibia 1 L/d: 58. Epigynum (Fig. 14A–B) anterior plate trapezoidal with pair of distinct processes at posterior corners and with light anterior median hump; posterior epigynal plate very indistinct, barely visible. Internal genitalia (Figs 13C, 14C–D) with pair of large pore plates close together and connected anteriorly by narrow sclerite; with membranous anterior structures and pair of oval lateral sacs near bases of posterior processes.

Variation

Tibia 1 in eleven males: 9.1–10.6 (mean 10.0); in eleven females: 6.1–7.3 (mean 6.6). Subdistal dark rings on leg femora and tibiae variably distinct; number of spines on male leg femora 1–2 variable, apparently size dependent.

Barcoding

We sequenced two specimens, originating from neighboring sites at the type locality (Table 1). The intraspecific K2P distance was 0.2%. The NJ tree (Fig. 1) groups this species with those sharing spines on the male femora rather than with those sharing the absence of lateral marks on the carapace.

Distribution

Known from three neighboring localities (within 2 km) in the western Andean slopes of central Ecuador (Fig. 3).

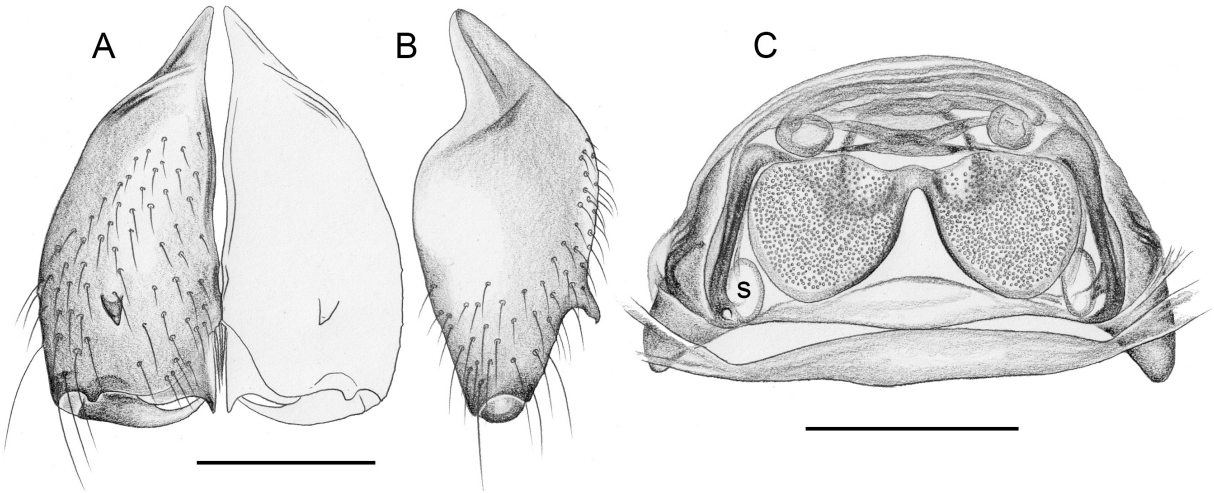

Fig. 13. *Tunda nadineae* Huber gen. et sp. nov., ♂♀, from Ecuador, Santo Domingo and Cotopaxi, Otonga Nature Reserve. **A–B**. Male chelicerae, frontal and lateral views, ZFMK Ar 24765. **C**. Cleared female genitalia, dorsal view, ZFMK Ar 24764. Abbreviation: s = membranous lateral sac. Scale lines = 0.3 mm.

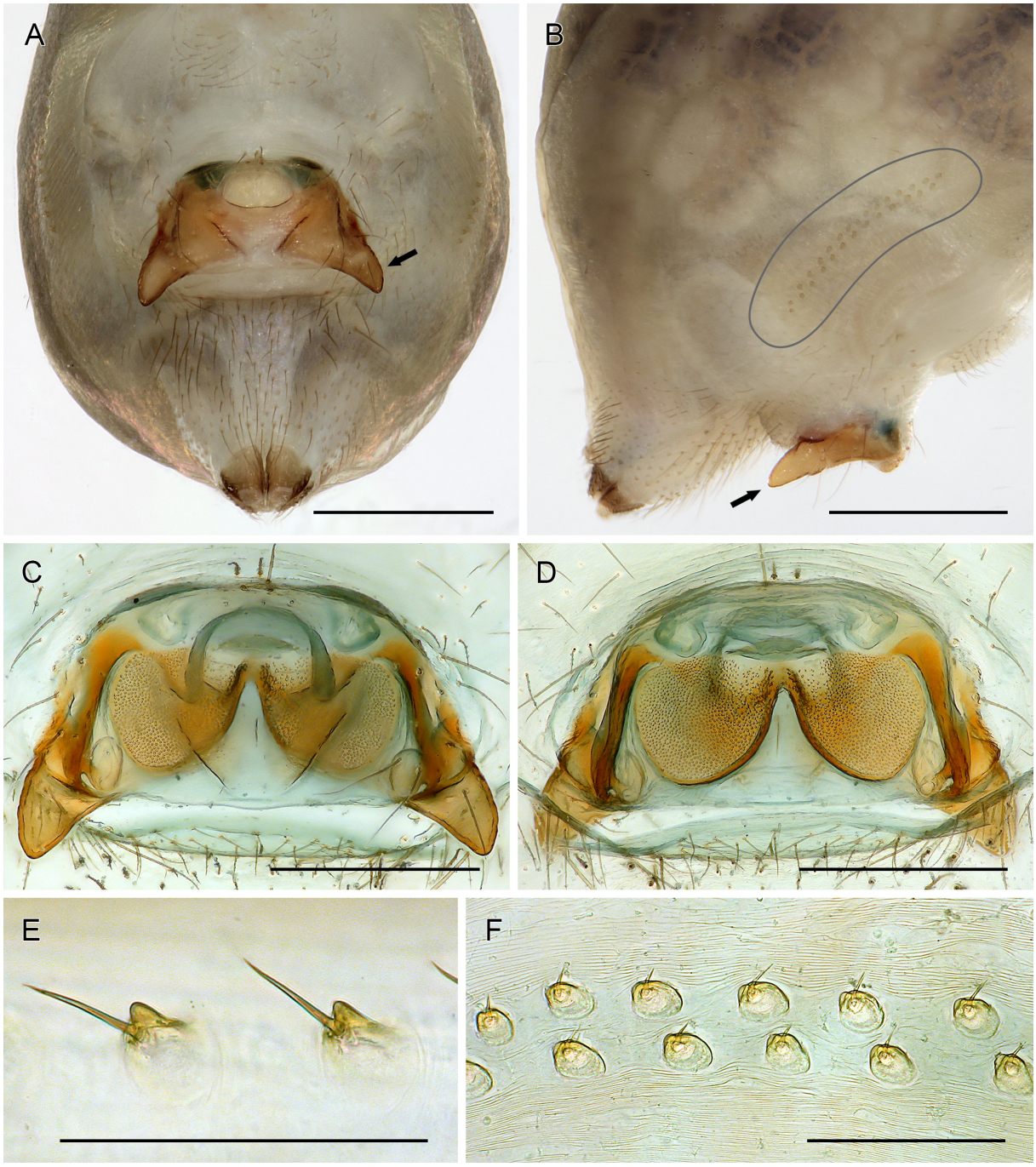

Fig. 14. *Tunda nadineae* Huber gen. et sp. nov., ♀♀, from Ecuador, Cotopaxi, Otonga Nature Reserve. **A–B**. Abdomen, ventral and lateral views, ZFMK Ar 24764; arrows point at distinctive pair of processes of anterior epigynal plate; circled area in B marks band of stridulatory hair bases. **C–D**. Cleared genitalia, ventral and dorsal views, ZFMK Ar 24764. **E**. Modified hair bases on femur 4, ZFMK Ar 24763. **F**. Modified hair bases on abdomen, ZFMK Ar 24764. Scale lines: A–B = 0.5 mm; C–D = 0.3 mm; E–F = 0.1 mm.

Natural history

Label data suggest that this species does not share the ground-level microhabitat of other congeners but lives higher among the vegetation ("beating branches", "beating trees"). This is in agreement with the slightly lighter coloration of this species and with the more slender legs (males with highest value for tibia 1 L/d among congeners).

Tunda totoro Huber gen. et sp. nov.
urn:lsid:zoobank.org:act:4EEE4F5A-030E-4ED1-B20C-C7E89D3122F1
Figs 2E–F, 15–18

Diagnosis

Easily distinguished from known congeners by armature of male chelicerae (Fig. 17A–B; unique pair of long apophyses in very distal position overhanging fangs) and by shape of epigynum (Fig. 18A, C; with distinctive anterior process).

Etymology

The species name is derived from the type locality, noun in apposition.

Type material

Holotype

COLOMBIA – **Cauca** • ♀; 14 km NNE of Popayán, Vereda Brisas de Totoro; 2.5571° N, 76.5739° W; 1700 m a.s.l.; 1 Sep. 2022; B.A. Huber and B.A. Ospina leg.; MUSENUV-Ar-3308.

Paratypes

COLOMBIA – **Cauca** • 1 ♂; same collection data as for holotype; ICN-Ar 13832 • 2 ♂♂, 1 ♀; same collection data as for holotype; MUSENUV-Ar-3309 • 2 ♂♂, 1 ♀; same collection data as for holotype; ZFMK Ar 24775.

Other material examined

COLOMBIA – **Cauca** • 1 ♂, 3 ♀♀, in pure ethanol; same collection data as for holotype; ZFMK Col201 (voucher of G04) • 2 ♂♂, 1 ♀, 1 juv.; 5 km E of Popayán, Finca El Diviso; 2.4386° N, 76.5595° W; 2000 m a.s.l.; 1 Sep. 2022; B.A. Huber and B.A. Ospina leg.; MUSENUV-Ar-3310 • 2 ♂♂; same collection data as for preceding; ZFMK Ar 24776 • 2 ♂♂, 2 ♀♀, in pure ethanol; same collection data as for preceding; ZFMK Col202. – **Valle del Cauca** • 2 ♂♂, 2 ♀♀, 1 juv.; 20 km NE of Palmira, Reserva Madhú, 'site 2'; 3.6287° N, 76.1659° W; 2240 m a.s.l.; 31 Aug. 2022; B.A. Huber and J. Cabra-García leg.; MUSENUV-Ar-3311 • 2 ♂♂, 1 ♀; same collection data as for preceding; ZFMK Ar 24777 • 1 ♂, 3 ♀♀, in pure ethanol; same collection data as for preceding; ZFMK Col197 (voucher of G03) • 2 ♂♂, 1 ♀; 20 km NE of Palmira, Reserva Madhú, 'site 1'; 3.6371° N, 76.1455° W; 2500 m a.s.l.; 31 Aug. 2022; B.A. Huber and J. Cabra-García leg.; ZFMK Ar 24778 • 1 ♂, in pure ethanol; same collection data as for preceding; ZFMK Col193 (voucher of UH231) • 1 ♂; 10 km NW of Cali, Reserva Forestal de Bitaco, 'site 1'; 3.5695° N, 76.5770° W; 2050 m a.s.l.; 30 Aug. 2022; B.A. Huber, J. Cabra-García and O. Cuéllar leg.; ZFMK Ar 24779 • 2 ♂♂; 15 km W of Buga, Reserva Forestal Yotoco, 'site 1'; 3.873° N, 76.435° W; 1570 m a.s.l.; 10–11 Sep. 2022; B.A. Huber and G.A. Rodríguez leg.; ZFMK Ar 24870 • 1 ♀; same collection data as for preceding; ZFMK Ar 24871 • 2 ♀♀, in pure ethanol; same collection data as for preceding; ZFMK Col256, Col261.

Description

Male (paratype, ZFMK 24775)

Measurements. Total body length 3.5, carapace width 1.4. Distance PME–PME 180 µm; diameter PME 155 µm; distance PME–ALE 120 µm; distance AME–AME 30 µm; diameter AME 60 µm. Leg 1: 32.9

(8.2+0.6+8.4+13.5+2.2), tibia 2: 5.9, tibia 3: 4.6, tibia 4: 5.8; tibia 1 L/d: 70; diameters of leg femora 0.20–0.22; diameters of leg tibiae 0.12.

Color (in ethanol). Prosoma whitish with wide dark brown median band including ocular area and clypeus, on clypeus medially divided by light area, with wide brown lateral bands not connected to median band; sternum brown, laterally slightly lighter; legs brown, tips of femora and tibiae lighter, without darker rings; abdomen pale bluish with dark bluish internal marks dorsally and laterally, ventrally with dark ochre plate in front of gonopore and small bluish internal mark behind gonopore.

Body. Habitus as in Fig. 2E. Ocular area raised. Carapace with deep thoracic groove. Clypeus unmodified. Sternum wider than long (0.90/0.65), unmodified. Abdomen barely longer than high, pointed at spinnerets.

Chelicerae. As in Fig. 17A–B; with distinctive pair of distal apophyses projecting beyond fangs.

Palps. As in Fig. 15; coxa with rounded retrolateral-ventral process; trochanter unmodified; femur proximally with light retrolateral-ventral process, distally widened, with strong ventral apophysis directed distally (Fig. 16A); femur-patella condyles not shifted toward one side; tibia-tarsus condyles indistinct, apparently not shifted to one side; tarsus with large dorsal process; procursus (Fig. 16A–C) proximally simple, almost same width throughout, distally curved toward prolateral, tip with large transparent dorsal flap; genital bulb (Fig. 16D–F) distally complex, with curved main apophysis set with small spikes on prolateral side, and undulating process on retrolateral side.

Legs. With spines on femora 1 and 2: femur 1 with 3–4 long spines and ~15 short spines; femur 2 with 1 long and ~5 short spines; spines restricted to distal halves of leg segments; with strongly curved hairs

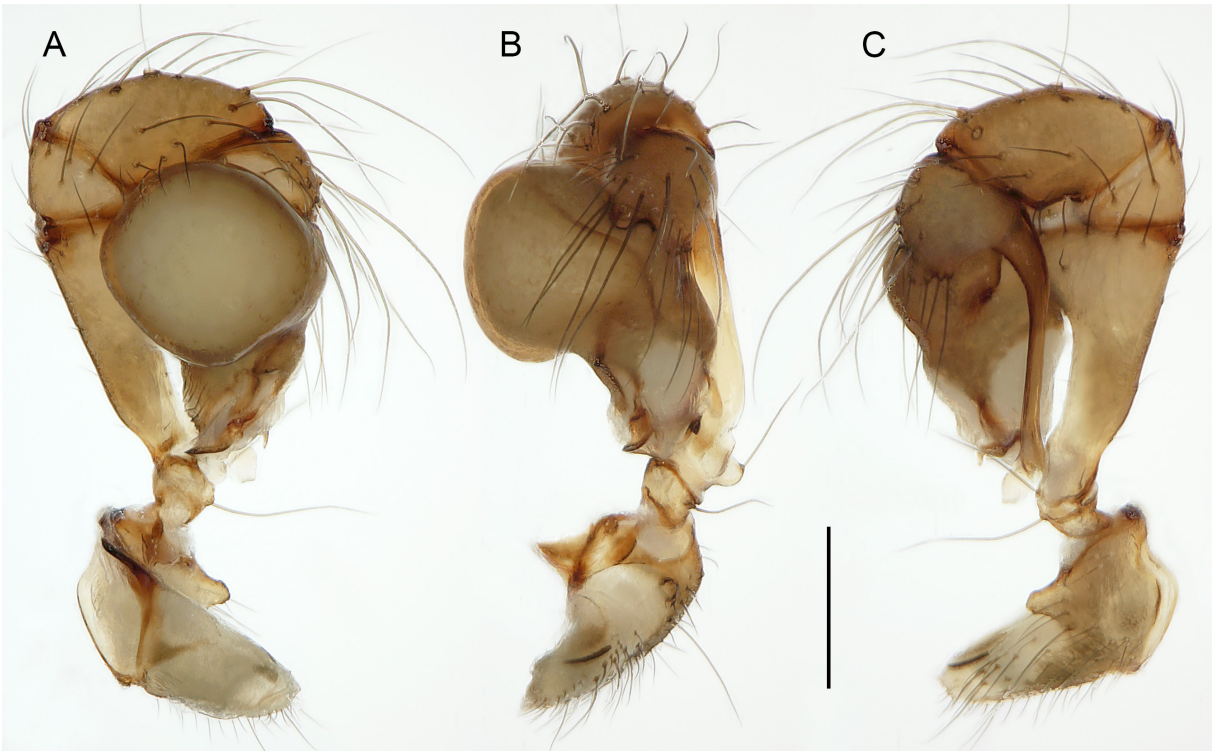

Fig. 15. *Tunda totoro* Huber gen. et sp. nov., paratype, ♂, from Colombia, Cauca, Vereda Brisas de Totoro, ZFMK Ar 24775. Left palp in prolateral, dorsal and retrolateral views. Scale line = 0.3 mm.

on tibiae and metatarsi 1–3, leg 4 with some weakly curved hairs on tibia only; with short sexually dimorphic hairs dorsally on tibiae; retrolateral trichobothrium of tibia 1 at 5%; prolateral trichobothrium present on all tibiae; tarsus 1 with ~30 pseudosegments, mostly distinct (except proximally).

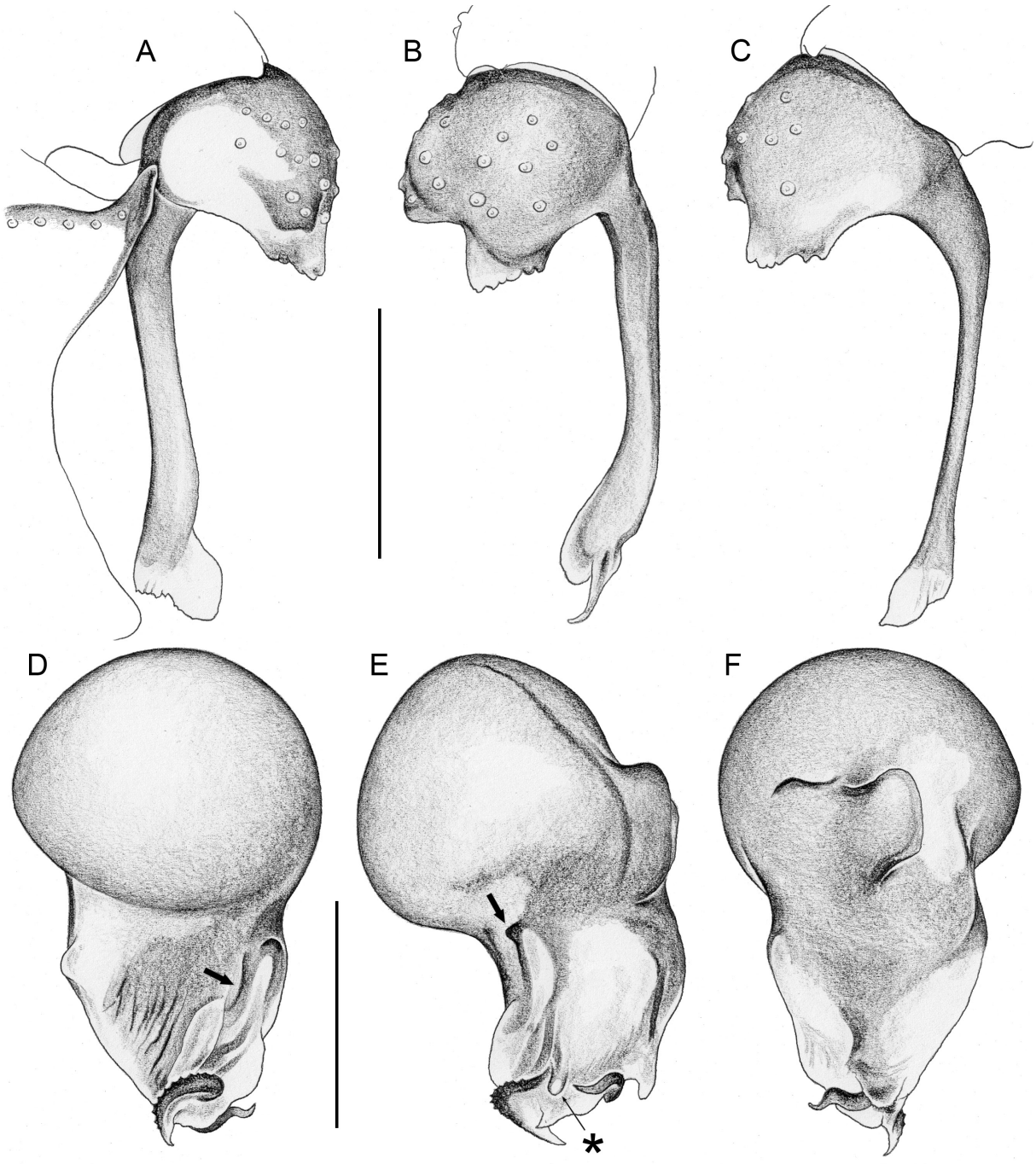

Fig. 16. *Tunda totoro* Huber gen. et sp. nov., paratype, ♂, from Colombia, Cauca, Vereda Brisas de Totoro, ZFMK Ar 24775. **A–C**. Left palpal tarsus and procursus (in A with parts of femur) in prolateral, dorsal and retrolateral views. **D–F**. Left genital bulb in prolateral, dorsal and retrolateral views; bold arrow in D points at sclerite that is shorter in males from Valle del Cauca; bold arrow in E points at process that is variably strong, and absent in smallest males (Bitaco); asterisk marks sperm duct opening. Scale lines = 0.3 mm.

Female (holotype)

In general (habitus, color pattern) similar to male (Fig. 2F), but leg femora without spines, leg tibiae without sexually dimorphic short hairs, with stridulatory organ between femur 4 (Fig. 18G–H; row of ~12 modified hair bases proximally) and abdomen (Fig. 18B, E–F; ~25 modified hair bases in two rows, laterally above book lung covers). Total body length 3.1, carapace width 1.2. Distance PME–PME 130 µm; diameter PME 130 µm; distance PME–ALE 120 µm; distance AME–AME 30 µm; diameter AME 60 µm. Leg 1: 22.3 (5.5+0.4+5.8+8.9+1.7), tibia 2: 3.9, tibia 3: 3.0, tibia 4: 4.1; tibia 1 L/d: 53. Epigynum (Fig. 18A–B) anterior plate with distinctive anterior projection flanked by pair of light anterior indentations; posterior epigynal plate short and simple. Internal genitalia (Figs 17C, 18C–D) with pair of large, triangular pore plates connected anteriorly; with simple membranous anterior structures; with pair of oval lateral sacs.

Variation

Tibia 1 in 21 males: 6.5–10.0 (mean 8.1); in 17 females: 4.8–6.8 (mean 5.9). Sclerotized band on prolateral side of genital bulb (arrow in Fig. 16D) shorter in males from Valle del Cauca; dorsal conical process on genital bulb (arrow in Fig. 16E) variably strong, in smallest males absent (Reserva Forestal de Bitaco). Sternum sometimes monochromous brown. Male chelicerae sometimes without proximal whitish area. Clypeus sometimes not medially lighter. Spines on male femora variable, apparently related to size, some small males without spines, largest males with 4 long and ~25 short spines on femur 1. Anterior epigynal projection in females from Yotoco more rounded, i.e. without pair of laterally projecting humps.

Barcoding

We sequenced three specimens, two of them from neighboring sites in Valle del Cauca, one from the type locality in Cauca (geographic distance 127 km) (Table 1). The intraspecific K2P distance between the specimens from neighboring sites was 0.3%, whereas their distances to the topotypical specimen were 12.7 and 12.9%. Despite this large genetic distance, we tentatively treat these specimens as conspecific because they appear essentially identical morphologically.

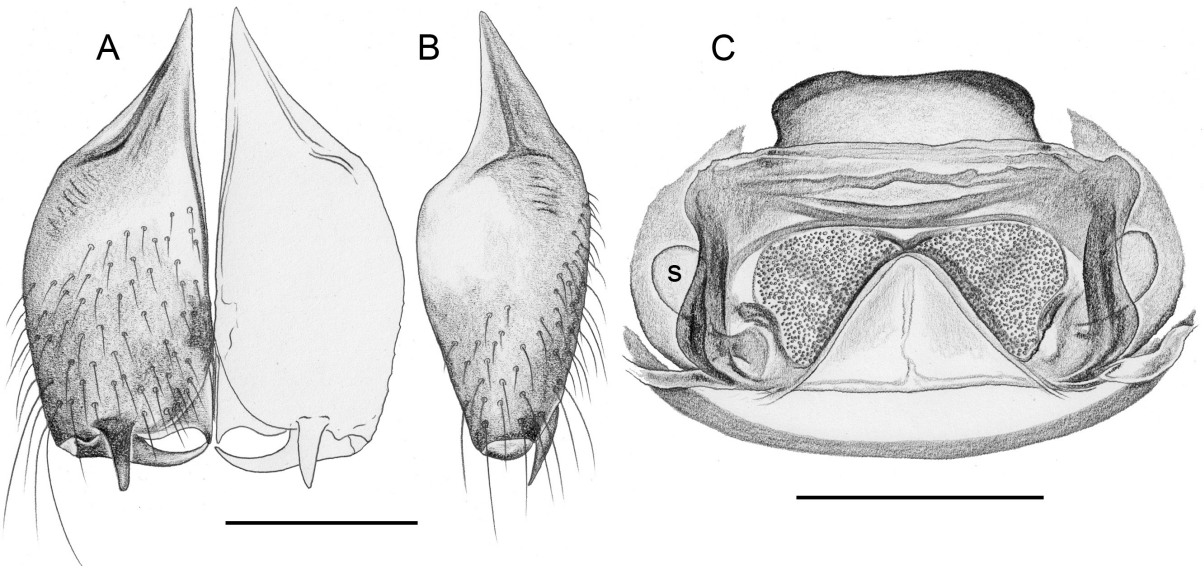

Fig. 17. *Tunda totoro* Huber gen. et sp. nov., paratypes, ♂♀, from Colombia, Cauca, Vereda Brisas de Totoro, ZFMK Ar 24775. **A–B**. Male chelicerae, frontal and lateral views. **C**. Cleared female genitalia, dorsal view. Abbreviation: s = membranous lateral sac. Scale lines = 0.3 mm.

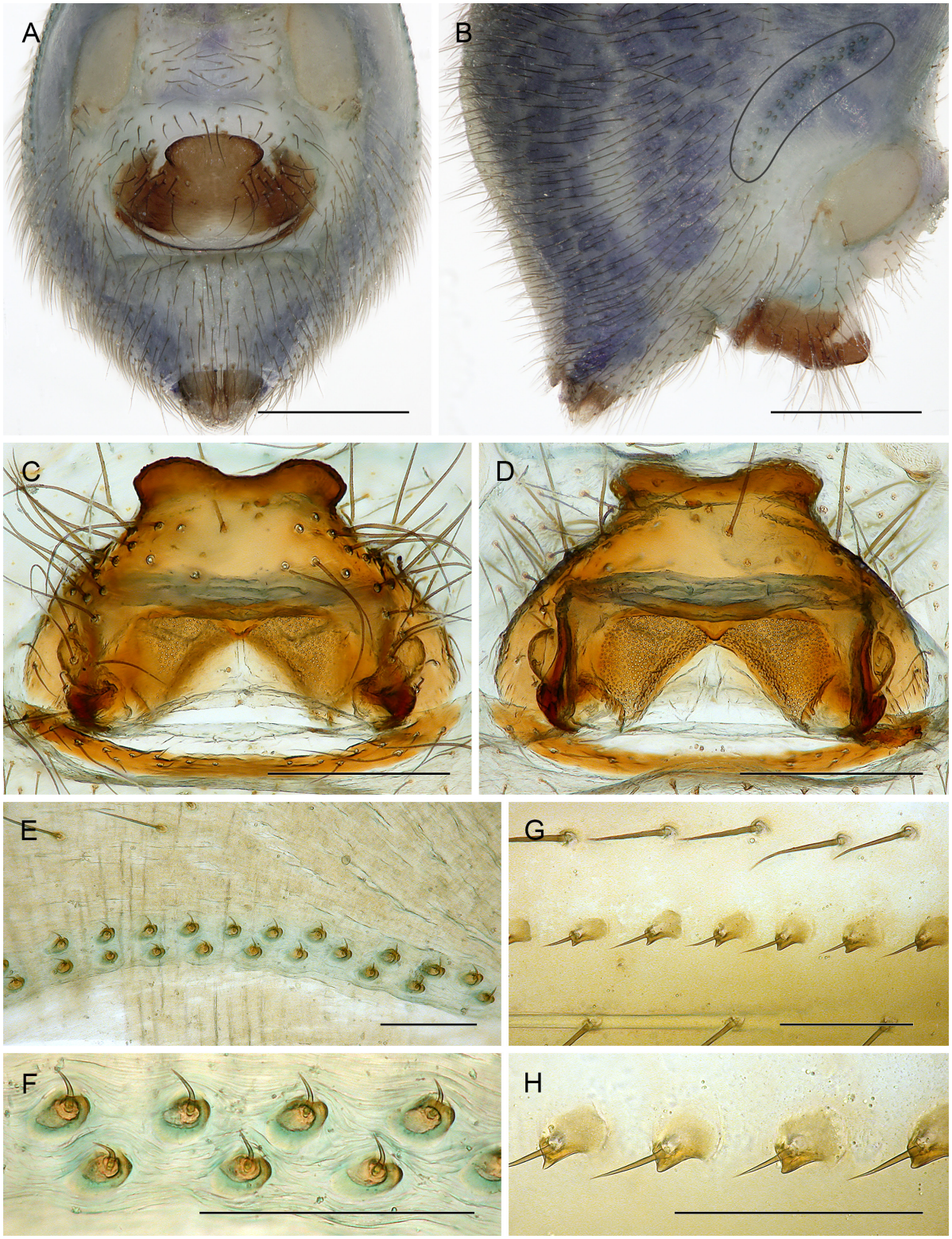

Fig. 18. *Tunda totoro* Huber gen. et sp. nov., paratype, ♀, from Colombia, Cauca, Vereda Brisas de Totoro, ZFMK Ar 24775. **A–B**. Abdomen, ventral and lateral views; circled area in B marks band of stridulatory hair bases. **C–D**. Cleared genitalia, ventral and dorsal views. **E–F**. Modified hair bases on abdomen, **G–H**. Modified hair bases on femur 4. Scale lines: A–B = 0.5 mm; C–D = 0.3 mm; E–H = 0.1 mm.

Distribution

Known from several localities in Cauca and Valle del Cauca, Colombia (Fig. 3).

Natural history

At the type locality, the spiders were collected from cavities and holes in the ground in an oak forest along a river (Fig. 4C). The spiders were hanging in their domed webs, in the back of the cavities/holes. Upon disturbance, they retreated deeper into crevices rather than to whirl or vibrate.

Tunda muki Huber gen. et sp. nov.
urn:lsid:zoobank.org:act:D69EBCD6-F936-41E1-BB4A-0CDC79483B67
Figs 2G–H, 19–22

Diagnosis

Easily distinguished from known congeners by armature of male chelicerae (Fig. 21A–B; 2–3 small apophyses on each side; other species with only one or with 5–7 apophyses on each side) and by unique shape of epigynal plate (Fig. 22A; hexagonal, as long as wide). From other species with more than one pair of cheliceral apophyses (*T. icazai* gen. et sp. nov., *T. pachoca* gen. et sp. nov.) also distinguished by presence of spines on male anterior femora (Fig. 19D) and by presence of distinct lateral marks on carapace (Fig. 2G–H).

Etymology

Named for the Muki (also spelled Muqui or Mooqui), a goblin-like creature in the mythology of the Andes; noun in apposition.

Type material

Holotype

ECUADOR – **Tungurahua** • ♀; S of Baños; 1.4134° S, 78.4340° W; 2100 m a.s.l.; 24 Sep. 2021; B.A. Huber and M. Herrera leg.; INABIO MECN-AR 1500.

Paratypes

ECUADOR – **Tungurahua** • 5 ♂♂, 4 ♀♀; same collection data as for holotype; INABIO MECN-AR 1501, MECN-AR 1502 • 5 ♂♂, 5 ♀♀; same collection data as for holotype; ZFMK Ar 24769.

Other material examined

ECUADOR – **Tungurahua** • 3 ♀♀, 1 juv., in pure ethanol; same collection data as for holotype; ZFMK Ecu169 (voucher of EB085, G39) • 1 ♂; between Baños and Puyo, above Río Verde (river); 1.388° S, 78.308° W; 1770 m a.s.l.; 25 Sep. 2021; B.A. Huber and M. Herrera leg.; ZFMK Ar 24770 • 1 ♀, 4 juvs, in pure ethanol; same collection data as for preceding; ZFMK Ecu170 (voucher of EB086).

Description

Male (paratype, ZFMK 24769)

Measurements. Total body length 4.1, carapace width 1.7. Distance PME–PME 165 µm; diameter PME 155 µm; distance PME–ALE 180 µm; distance AME–AME 40 µm; diameter AME 45 µm. Leg 1: 31.9 (8.1+0.7+8.3+12.7+2.1), tibia 2: 5.6, tibia 3: 4.3, tibia 4: 5.4; tibia 1 L/d: 49; leg femur 2 thicker than others (0.37 vs 0.30–0.33); diameters of leg tibiae 0.16–0.17.

Color (in ethanol). Prosoma pale ochre-yellow with wide dark brown median band including ocular area and clypeus, with wide brown lateral bands not connected with median band posteriorly; sternum monochromous brown, only lateral margins lighter; legs brown, tips of femora and tibiae lighter, with

darker rings subdistally on femora and tibiae; abdomen pale bluish-gray with darker bluish internal marks dorsally and laterally, ventrally with large brown plate in front of gonopore and small bluish internal mark behind gonopore.

Body. Habitus as in Fig. 2G. Ocular area raised. Carapace with deep thoracic groove. Clypeus unmodified. Sternum wider than long (1.1/0.7), unmodified. Abdomen barely longer than high, pointed at spinnerets.

Chelicerae. As in Fig. 21A–B; with distinctive pair of apophyses near fang joints and additional small conical processes on frontal face (asymmetric: 2+1).

Palps. As in Fig. 19; coxa with rounded retrolateral-ventral process; trochanter unmodified; femur proximally with distinct retrolateral-ventral process, distally widened, with strong ventral apophysis directed distally (Fig. 20A); femur-patella condyles not shifted toward one side; tibia-tarsus condyles slightly shifted toward retrolateral side; tarsus with small dorsal process; procursus (Fig. 20A–C) proximally simple, almost same width throughout, distally curved toward prolateral, tip with simple

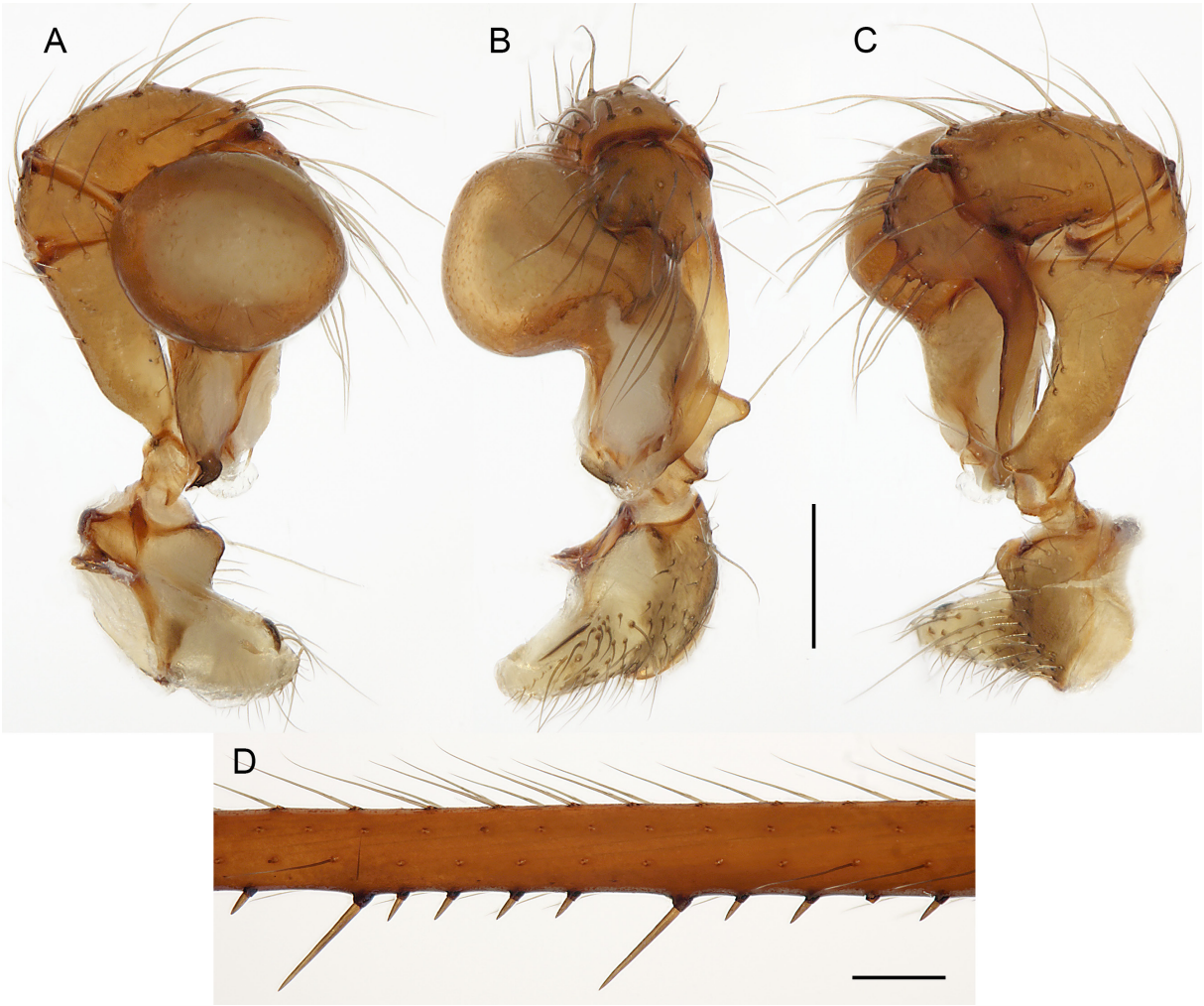

Fig. 19. *Tunda muki* Huber gen. et sp. nov., paratype, ♂, from Ecuador, Tungurahua, S of Baños, ZFMK Ar 24769. **A–C**. Left palp in prolateral, dorsal and retrolateral views. **D**. Part of femur 1, showing long and short spines. Scale lines = 0.3 mm.

sclerotized and membranous elements; genital bulb (Fig. 20D–F) distally with distinctive main apophysis and two slender processes on prolateral and dorsal sides, respectively.

Legs. With spines on femora 1 and 2: femur 1 with 3–4 long spines and ~15–20 short spines (Fig. 19D); femur 2 with 2–3 long and ~10–15 short spines; spines restricted to distal halves of leg segments; with

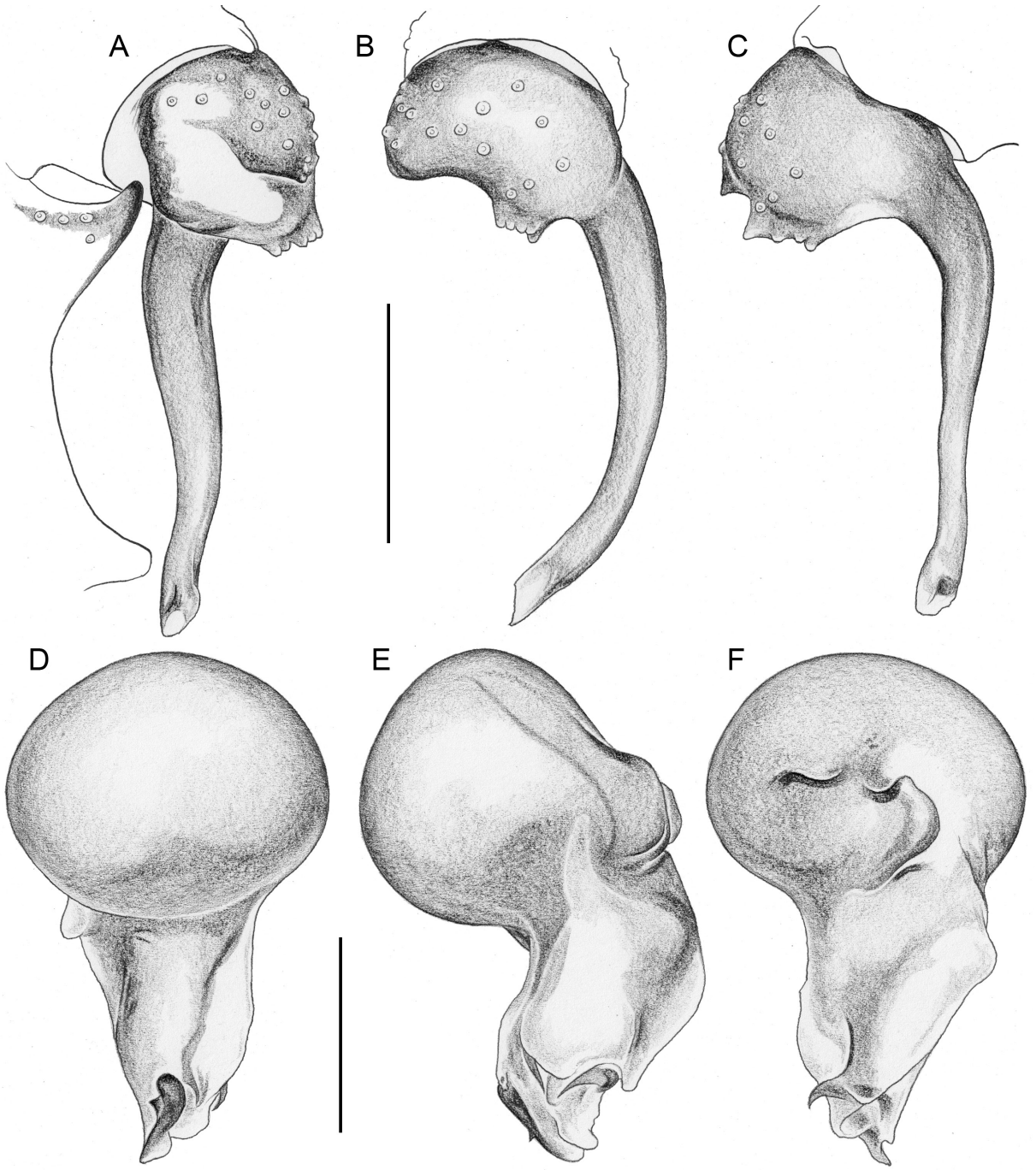

Fig. 20. *Tunda muki* Huber gen. et sp. nov., paratype, ♂, from Ecuador, Tungurahua, S of Baños, ZFMK Ar 24769. **A–C**. Left palpal tarsus and procursus (in A with parts of femur) in prolateral, dorsal and retrolateral views. **D–F**. Left genital bulb in prolateral, dorsal and retrolateral views. Scale lines = 0.3 mm.

strongly curved hairs on all tibiae and metatarsi, but few on leg 4; with short vertical hairs in low densities on all leg segments, especially dorsally on tibiae; retrolateral trichobothrium of tibia 1 at 6%; prolateral trichobothrium present on all tibiae; tarsus 1 with ~25 pseudosegments, mostly distinct (except proximally).

Female (holotype)

In general (habitus, color pattern) similar to male (Fig. 2H), but leg femora without spines and with slightly fewer short vertical hairs on legs, with stridulatory organ between femur 4 (Fig. 22F; row of modified hair bases proximally) and abdomen (Fig. 22B, E; ~28 modified hair bases in two rows, laterally near book lung covers). Total body length 4.0, carapace width 1.35. Distance PME–PME 130 µm; diameter PME 130 µm; distance PME–ALE 150 µm; distance AME–AME 30 µm; diameter AME 40 µm. Leg 1: 20.6 (5.2+0.5+5.3+7.8+1.8), tibia 2: 3.4, tibia 3: 2.7, tibia 4: 3.5; tibia 1 L/d: 41. Epigynum (Fig. 22A–B) anterior plate hexagonal, as long as wide (0.48); posterior epigynal plate short and simple. Internal genitalia (Figs 21C, 22C–D) with pair of large pore plates close together, without connecting sclerite, with pair of large sclerotized plates between pore plates and external epigynal cuticle; with membranous anterior structures and pair of oval sacs near lateral corners.

Variation

Tibia 1 in eleven males: 7.0–8.7 (mean 8.1); in ten females: 4.8–6.0 (mean 5.3). Some specimens in general lighter. Number of spines on male leg femora 1–2 variable, smallest male without spines. Anterior epigynal plate posteriorly variably protruding.

Barcoding

We sequenced two specimens originating from two nearby localities (geographic distance 14 km) (Table 1). The intraspecific K2P distance was 1.9%.

Distribution

Known from two nearby localities (distance 14 km) on the eastern Andean slopes of central Ecuador (Fig. 3).

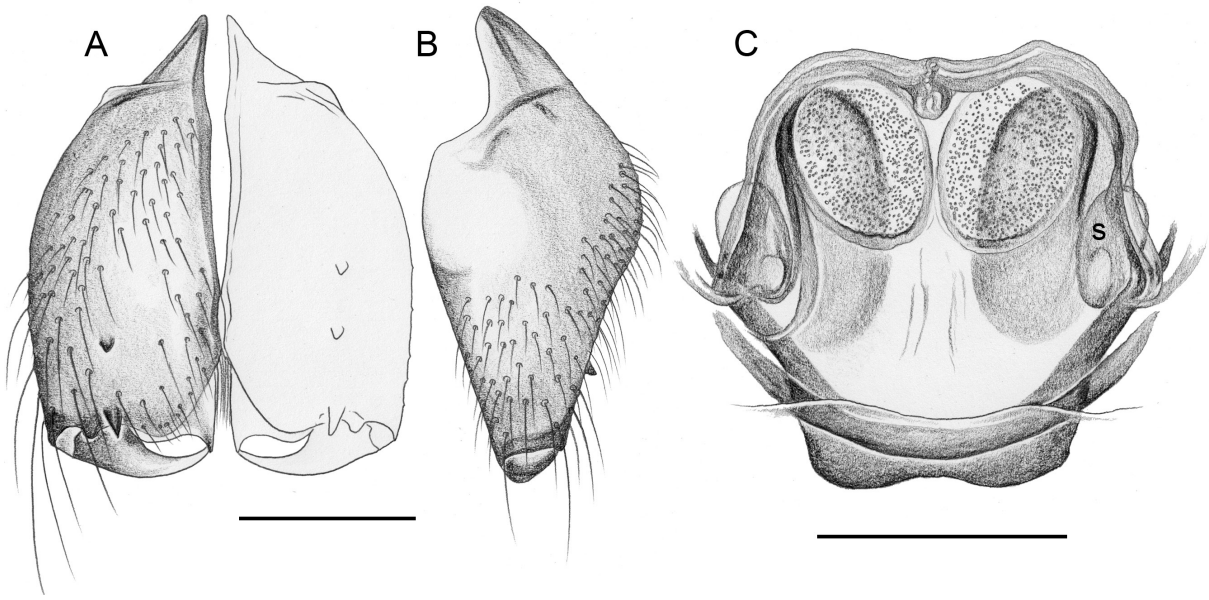

Fig. 21. *Tunda muki* Huber gen. et sp. nov., paratypes, ♂♀, from Ecuador, Tungurahua, S of Baños; ZFMK Ar 24769. **A–B**. Male chelicerae, frontal and lateral views. **C**. Cleared female genitalia, dorsal view. Abbreviation: s = membranous lateral sac. Scale lines = 0.3 mm.

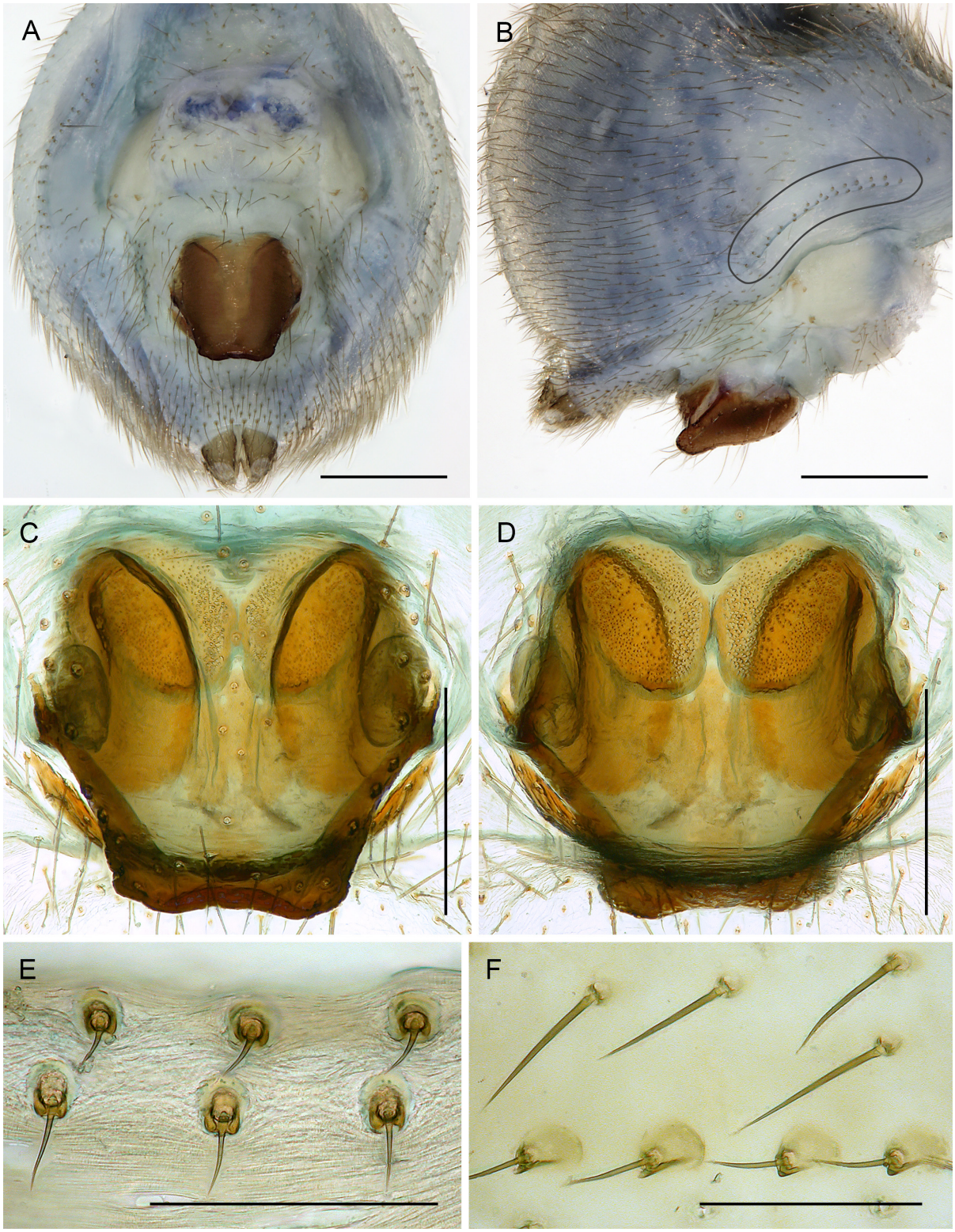

Fig. 22. *Tunda muki* Huber gen. et sp. nov., paratype, ♀, from Ecuador, Tungurahua, S of Baños, ZFMK Ar 24769. **A–B**. Abdomen, ventral and lateral views; circled area in B marks band of stridulatory hair bases. **C–D**. Cleared genitalia, ventral and dorsal views. **E**. Modified hair bases on abdomen. **F**. Modified hair bases (and regular hairs for comparison) on femur 4. Scale lines: A–B = 0.5 mm; C–D = 0.3 mm; E–F = 0.1 mm.

Natural history

At the type locality (Fig. 4D), the spiders were very abundant in a degraded forest along the river, occupying almost every large hole in the ground. Above Río Verde they were mostly found in cavities of the vertical walls in a steep ravine in humid forest.

Tunda otonga Huber gen. et sp. nov.
urn:lsid:zoobank.org:act:E93B4859-E421-472A-AA36-DBE7C7445569
Figs 23–26

Diagnosis

Easily distinguished from known congeners by armature of male chelicerae (Fig. 25A–B; one pair of tiny apophyses in very distal position) and by shape and size of epigynal plate (Fig. 26A–B; triangular posterior half, trapezoidal anterior half; very small relative to abdomen). From syntopic *T. nadineae* gen. et sp. nov. also by presence of distinct lateral marks on carapace.

Etymology

The species name is derived from the type locality, noun in apposition.

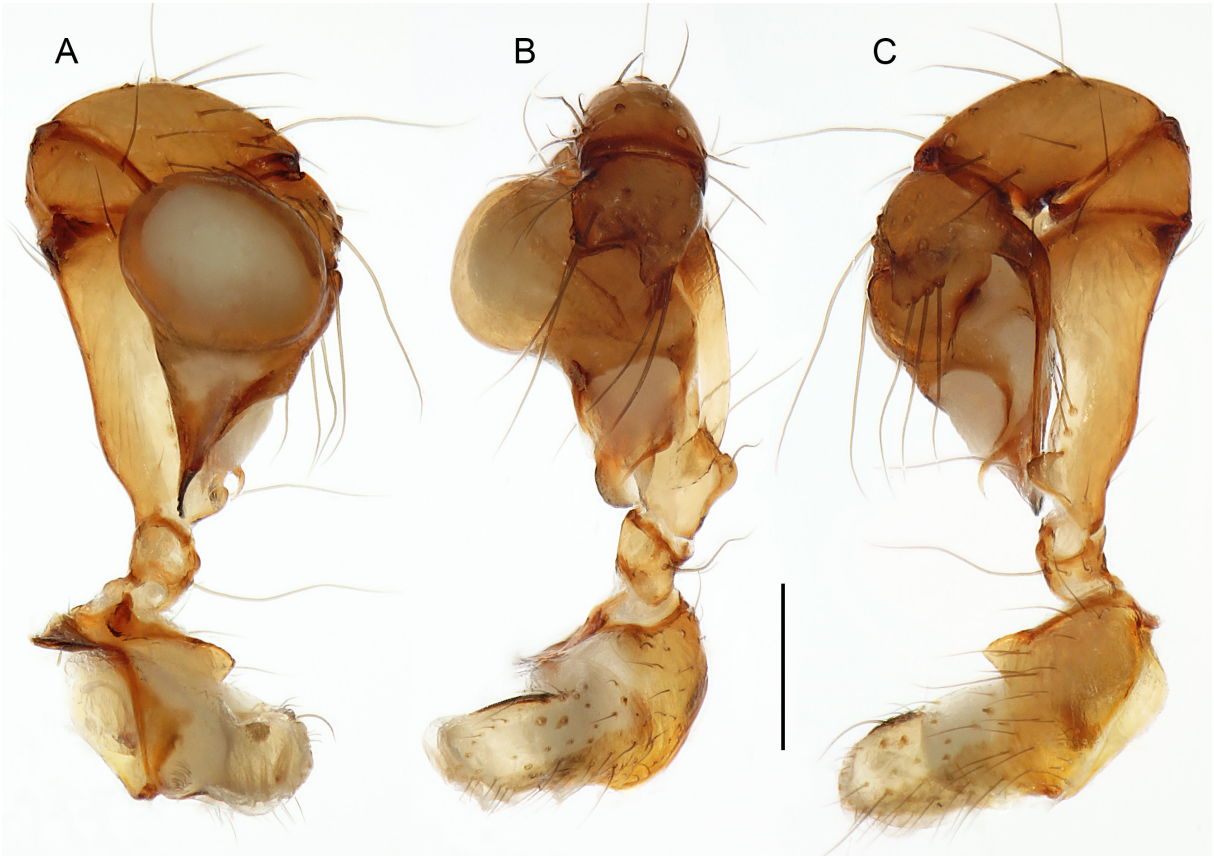

Fig. 23. *Tunda otonga* Huber gen. et sp. nov., paratype, ♂, from Ecuador, Cotopaxi, Otonga Nature Reserve, ZFMK Ar 24767. Right palp (mirrored) in prolateral, dorsal and retrolateral views. Scale line = 0.3 mm.

Type material

Holotype

ECUADOR – **Cotopaxi** • ♀; Otonga Nature Reserve; 0.4199° S, 79.0062° W; 2000 m a.s.l.; 25 Nov. 2019; E.E. Tapia leg.; QCAZI 278763.

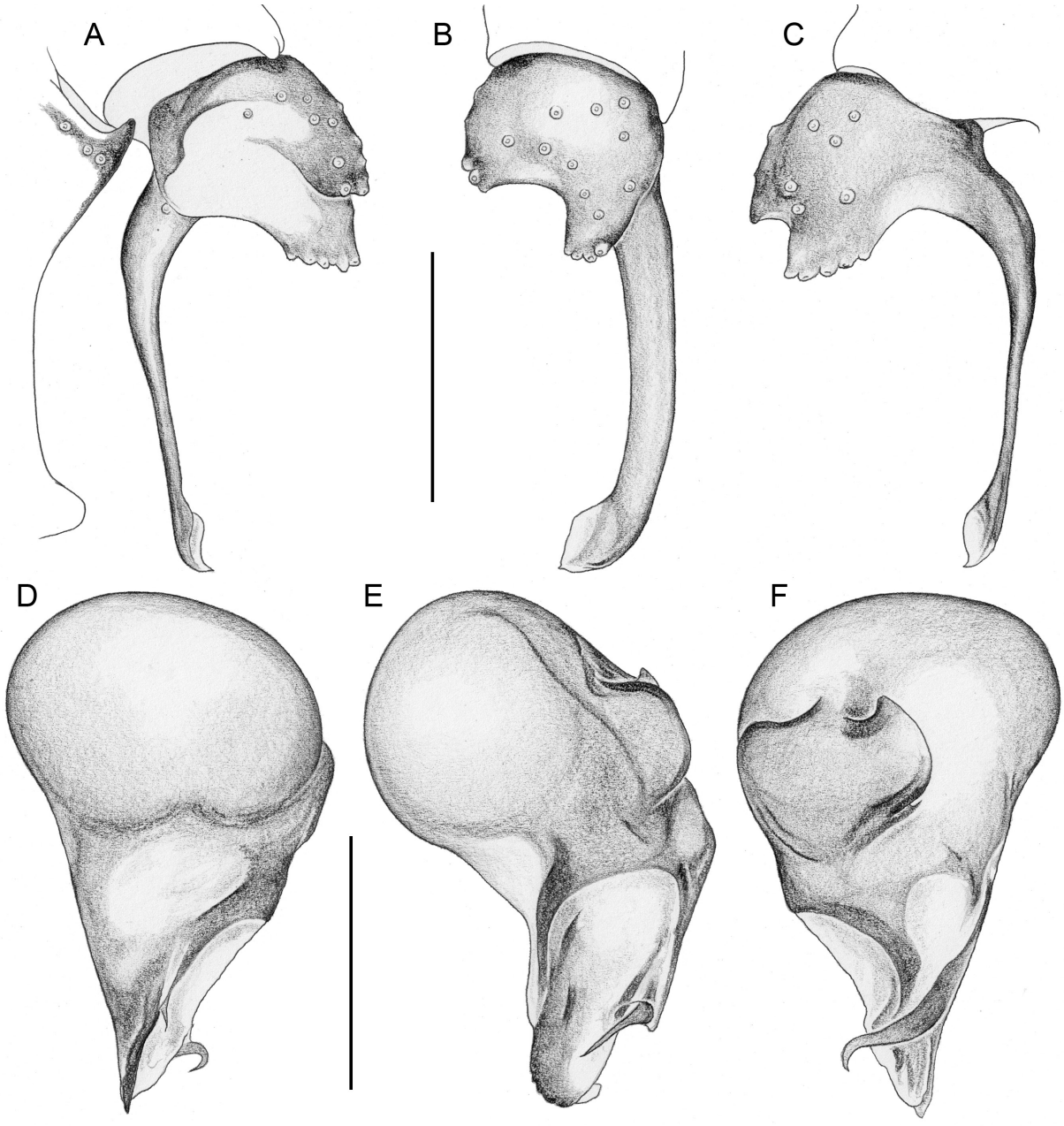

Fig. 24. *Tunda otonga* Huber gen. et sp. nov., paratype, ♂, from Ecuador, Cotopaxi, Otonga Nature Reserve, ZFMK Ar 24767. **A–C**. Left palpal tarsus and procursus (in A with parts of femur) in prolateral, dorsal and retrolateral views. **D–F**. Left genital bulb in prolateral, dorsal and retrolateral views. Scale lines = 0.3 mm.

Paratypes

ECUADOR – **Cotopaxi** • 2 ♂♂; same collection data as for holotype; QCAZI 278764 • 3 ♀♀; same collection data as for holotype; QCAZI 278765 • 1 ♂, 1 ♀; same locality as for holotype; 5–7 Sep. 2014; N. Dupérré, E.E. Tapia and C.A. Tapia leg.; ZFMK Ar 24766 • 1 ♂; same collection data as for holotype; ZFMK Ar 24767 ("Dup041"; voucher of EB008) • 1 ♀; same collection data as for holotype; ZFMK Ar 24768 ("Dup042"; voucher of EB009).

Description

Male (paratype, QCAZI 278764)

Measurements. Total body length 3.6, carapace width 1.75. Distance PME–PME 140 µm; diameter PME 150 µm; distance PME–ALE 140 µm; distance AME–AME 30 µm; diameter AME 65 µm. Leg 1: 49.5 (11.9+0.7+11.9+21.1+3.9), tibia 2: 8.7, tibia 3: 7.1, tibia 4: 8.3; tibia 1 L/d: 64; leg femora 1 and 2 slightly thicker than others (0.31 vs 0.27); diameters of leg tibiae 0.18–0.19.

Color (in ethanol). Prosoma ochre-yellow with wide dark brown median band including ocular area but not extending to clypeus, with brown lateral bands that are not connected with median band posteriorly; sternum monochromous orange; legs brown, tips of femora and tibiae lighter, with indistinct darker rings subdistally on femora and tibiae; abdomen pale bluish-gray with darker bluish internal marks dorsally and laterally, ventrally with light brown plate in front of gonopore.

Body. Habitus similar to *T. muki* gen. et sp. nov. (cf. Fig. 2G). Ocular area raised. Carapace with deep thoracic groove. Clypeus unmodified. Sternum wider than long (1.2/0.7), unmodified. Abdomen barely longer than high, pointed at spinnerets.

Chelicerae. As in Fig. 25A–B; with pair of tiny frontal apophyses and indistinct frontal lighter area; width of chelicerae: 0.69; distance between tips of apophyses: 0.25.

Palps. As in Fig. 23; coxa with conical retrolateral-ventral process; trochanter unmodified; femur proximally with rounded retrolateral-ventral process, distally widened, with strong ventral apophysis directed distally (Fig. 24A); femur-patella condyles not shifted toward one side; tibia-tarsus condyles

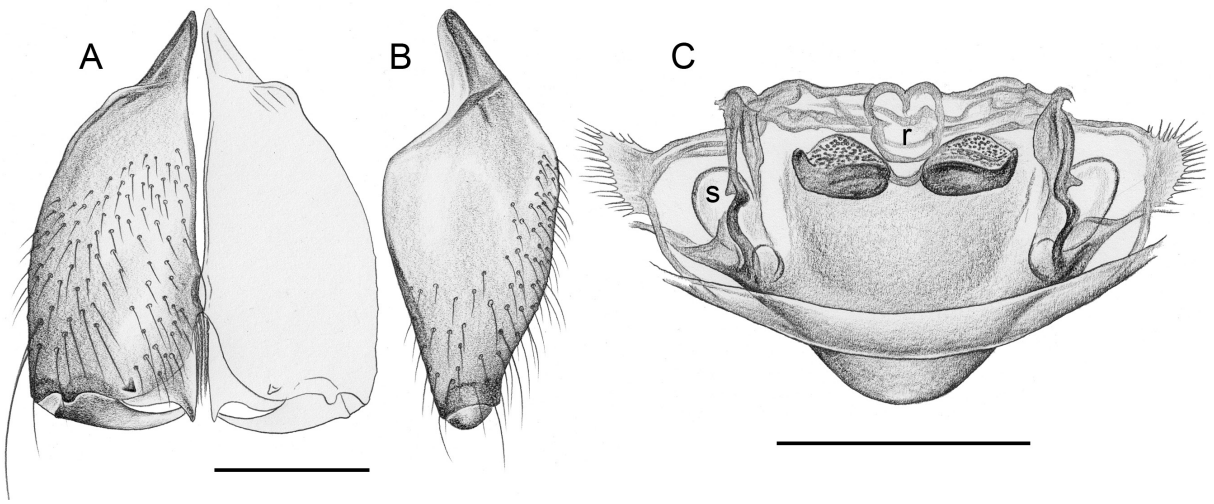

Fig. 25. *Tunda otonga* Huber gen. et sp. nov., paratypes, ♂♀, from Ecuador, Cotopaxi, Otonga Nature Reserve. **A–B**. Male chelicerae, frontal and lateral views, ZFMK Ar 24767. **C**. Cleared female genitalia, dorsal view, ZFMK Ar 24766. Abbreviations: r = putative receptacle; s = membranous lateral sac. Scale lines = 0.3 mm.

slightly shifted toward retrolateral side; tarsus with large dorsal process; procursus (Fig. 24A–C) proximally simple, distal half in lateral view very narrow, in dorsal view wide throughout, distally curved toward prolateral, tip with simple sclerotized and membranous elements; genital bulb (Fig. 24D–F) distally with strong main apophysis provided with indistinct teeth and distinct slender process on retrolateral-dorsal side; second process (prolateral-dorsal) present but tiny and barely visible.

Legs. With spines on femora 1 and 2: femur 1 with 4–5 long spines and ~15–20 short spines; femur 2 with 3–4 long and ~10 short spines; spines restricted to distal halves of leg segments; with strongly

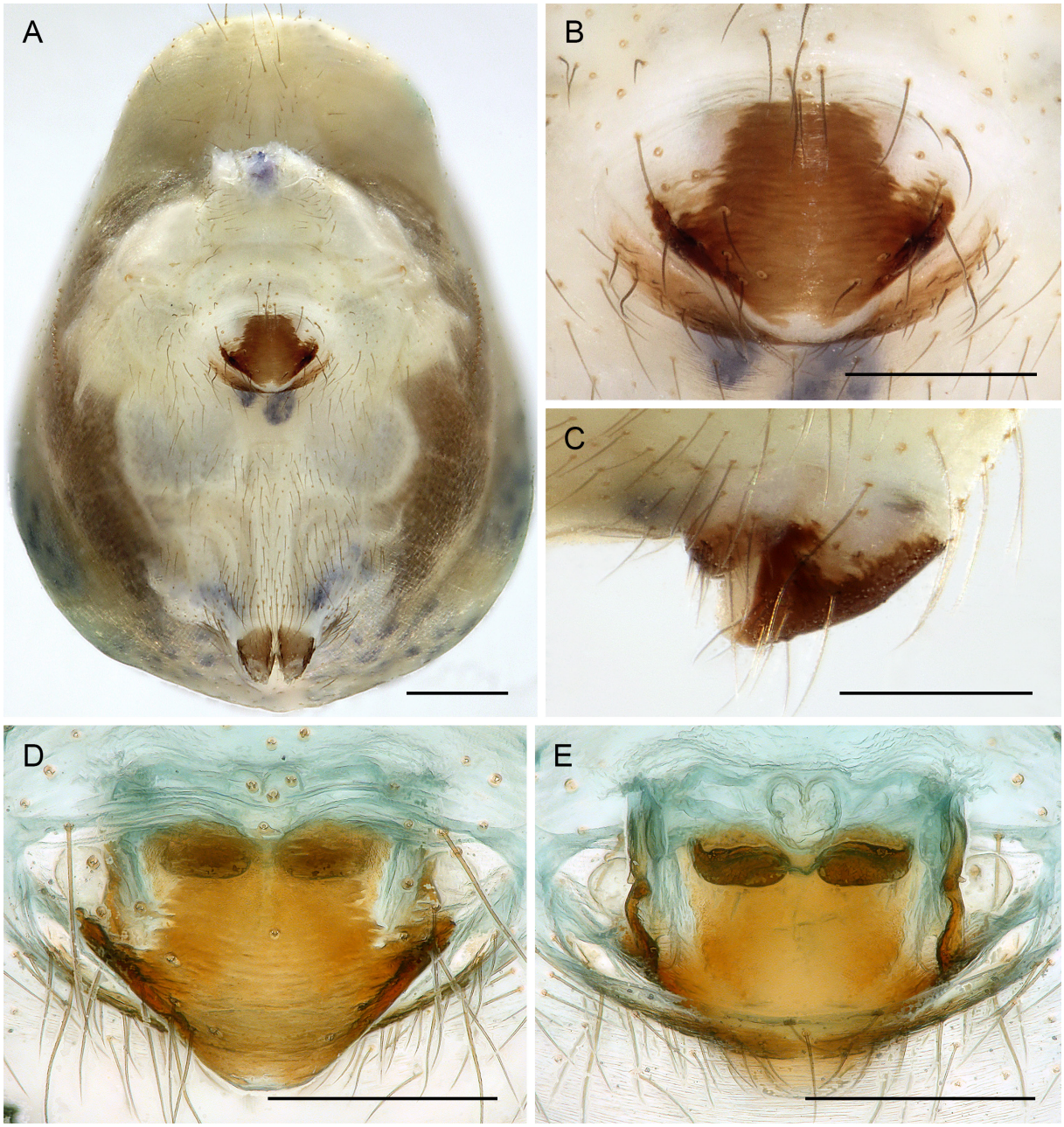

Fig. 26. *Tunda otonga* Huber gen. et sp. nov., paratype, ♀, from Ecuador, Cotopaxi, Otonga Nature Reserve, ZFMK Ar 24766. **A**. Abdomen, ventral view. **B–C**. Epigynum, ventral and lateral views. **D–E**. Cleared genitalia, ventral and dorsal views. Scale lines: A = 0.5 mm; B–E = 0.3 mm.

curved hairs apparently on all tibiae and metatarsi (many hairs missing); with short vertical hairs on all leg segments, in higher than usual densities dorsally on tibiae; retrolateral trichobothrium of tibia 1 at 5%; prolateral trichobothrium present on all tibiae; tarsus 1 with ~45 pseudosegments, mostly distinct (except proximally).

Female (holotype)
In general (habitus, color pattern) similar to male, but clypeus darker (brown), sternum medially darker (brown) than laterally, leg femora without spines, leg tibiae with fewer short vertical hairs, with stridulatory organ between femur 4 (row of modified hair bases proximally) and abdomen (~28 modified hair bases in two rows, laterally near book lung covers). Total body length 3.9, carapace width 1.4. Distance PME–PME 120 µm; diameter PME 160 µm; distance PME–ALE 130 µm; distance AME–AME 25 µm; diameter AME 50 µm. Leg 1: 9.4+0.6+9.6+16.9 (tarsus missing), tibia 2: 6.6, tibia 3: 5.2, tibia 4: 6.6; tibia 1 L/d: 64. Epigynum (Fig. 26A–C) small relative to abdomen, anterior epigynal plate posteriorly triangular, anteriorly narrower and trapezoidal; posterior epigynal plate short but wide. Internal genitalia (Figs 25C, 26D–E) with pair of small pore plates connected by narrow sclerite; with membranous anterior structures including median 'receptacle', and pair of oval lateral sacs.

Variation

Tibia 1 in two other males: 11.6, 12.1; in five females: 8.6–9.7 (mean 9.0). Color variable but color pattern (carapace, clypeus, sternum) consistent. Small males with fewer spines on leg femora. Anterior epigynal plate variably protruding in lateral view.

Barcoding

We sequenced two specimens originating from the type locality (male and female in order to ascertain the correct matching of sexes). Their *CO1* sequences were identical.

Distribution

Known from type locality only, in Cotopaxi Province, Ecuador (Fig. 3).

Natural history

According to the labels, all specimens were collected in a little cave in a small waterfall.

Tunda chasca Huber gen. et sp. nov.
urn:lsid:zoobank.org:act:1E014AC2-A220-42A2-BF29-D8471749CAB0
Figs 27–30

Diagnosis

Easily distinguished from most known congeners by posterior process of anterior epigynal plate (Fig. 30A–B); epigynum of *T. ayahuma* gen. et sp. nov. similar but with longer and more offset process (cf. Figs 32A, 33A). From most congeners (except *T. ayahuma*, *T. angel* gen. et sp. nov., *T. nadineae* gen. et sp. nov.) also distinguished by male chelicerae with single pair of anterior apophyses in central position (Fig. 29A; in other species in distal position or with more than one pair of apophyses). From the very similar *T. ayahuma* also distinguished by pore plates in female internal genitalia wider apart (compare Fig. 29C with Fig. 31A–B). From *T. nadineae* also distinguished by presence of distinct lateral marks on carapace (cf. Fig. 2I–J) and by absence of female stridulatory organ.

Etymology

Named for Chasca, the Inca goddess of dawn and twilight; noun in apposition.

Type material

Holotype

ECUADOR – **Pichincha** • ♀; between San Juan and Chiriboga, 'site 2'; 0.2327° S, 78.7497° W; 1900 m a.s.l.; 15 Sep. 2021; B.A. Huber and M. Herrera leg.; INABIO MECN-AR 1492.

Paratypes

ECUADOR – **Pichincha** • 2 ♂♂, 4 ♀♀; same collection data as for holotype; INABIO MECN-AR 1493 • 2 ♂♂, 5 ♀♀, 1 juv.; same collection data as for holotype; ZFMK Ar 24759.

Other material examined

ECUADOR – **Pichincha** • 1 ♂, 7 ♀♀, 4 juvs, in pure ethanol; same collection data as for holotype; ZFMK Ecu123 (voucher of EB041 and G29). – **Cotopaxi** • 1 ♀; San Francisco de Las Pampas, Otonga Nature Reserve; 0.4199° S, 79.0062° W; 2000 m a.s.l.; 4–7 Sep. 2014; N. Dupérré, E.E. Tapia and C.A. Tapia leg.; hand collected in mosses; QCAZI 278755 • 1 ♀; same locality as for preceding; 24–30 May 2014; N. Dupérré, E.E. Tapia and C.A. Tapia leg.; "beating trees"; QCAZI 278756.

Description

Male (paratype, ZFMK Ar 24759)

Measurements. Total body length 3.7, carapace width 1.6. Distance PME–PME 170 µm; diameter PME 150 µm; distance PME–ALE 190 µm; distance AME–AME 30 µm; diameter AME 50 µm. Leg 1: 34.2 (8.1+0.6+8.8+14.0+2.7), tibia 2: 5.8, tibia 3: 4.5, tibia 4: 5.8; tibia 1 L/d: 61; leg femora 1 and 2 slightly thicker than others (0.28–0.30 vs 0.24–0.25); diameters of leg tibiae 0.14–0.15.

Color (in ethanol). Prosoma pale ochre with wide dark brown lateral bands and median band including ocular area; lateral bands not connected with median band posteriorly, clypeus with pair of parallel wide

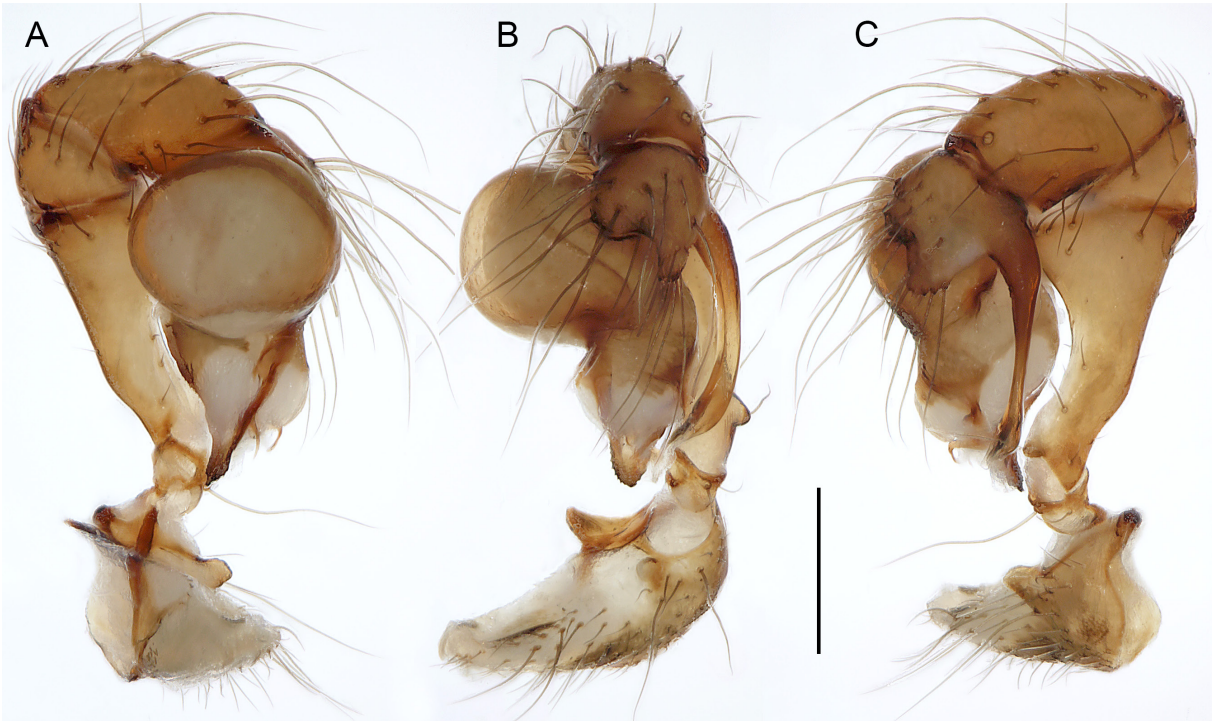

Fig. 27. *Tunda chasca* Huber gen. et sp. nov., paratype, ♂, from Ecuador, Pichincha, between San Juan and Chiriboga, ZFMK Ar 24759. Left palp in prolateral, dorsal and retrolateral views. Scale line = 0.3 mm.

bands, sternum light brown, medially darker; legs brown, tips of femora and tibiae lighter, without darker rings; abdomen bluish-gray with darker bluish internal marks dorsally and laterally, ventrally with brown plate in front of gonopore and small bluish internal mark behind gonopore.

Body. Habitus as in *T. ayahuma* gen. et sp. nov. (cf. Fig. 2I). Ocular area strongly raised. Carapace with deep thoracic groove. Clypeus unmodified. Sternum wider than long (0.90/0.60), unmodified. Abdomen barely longer than high, pointed at spinnerets.

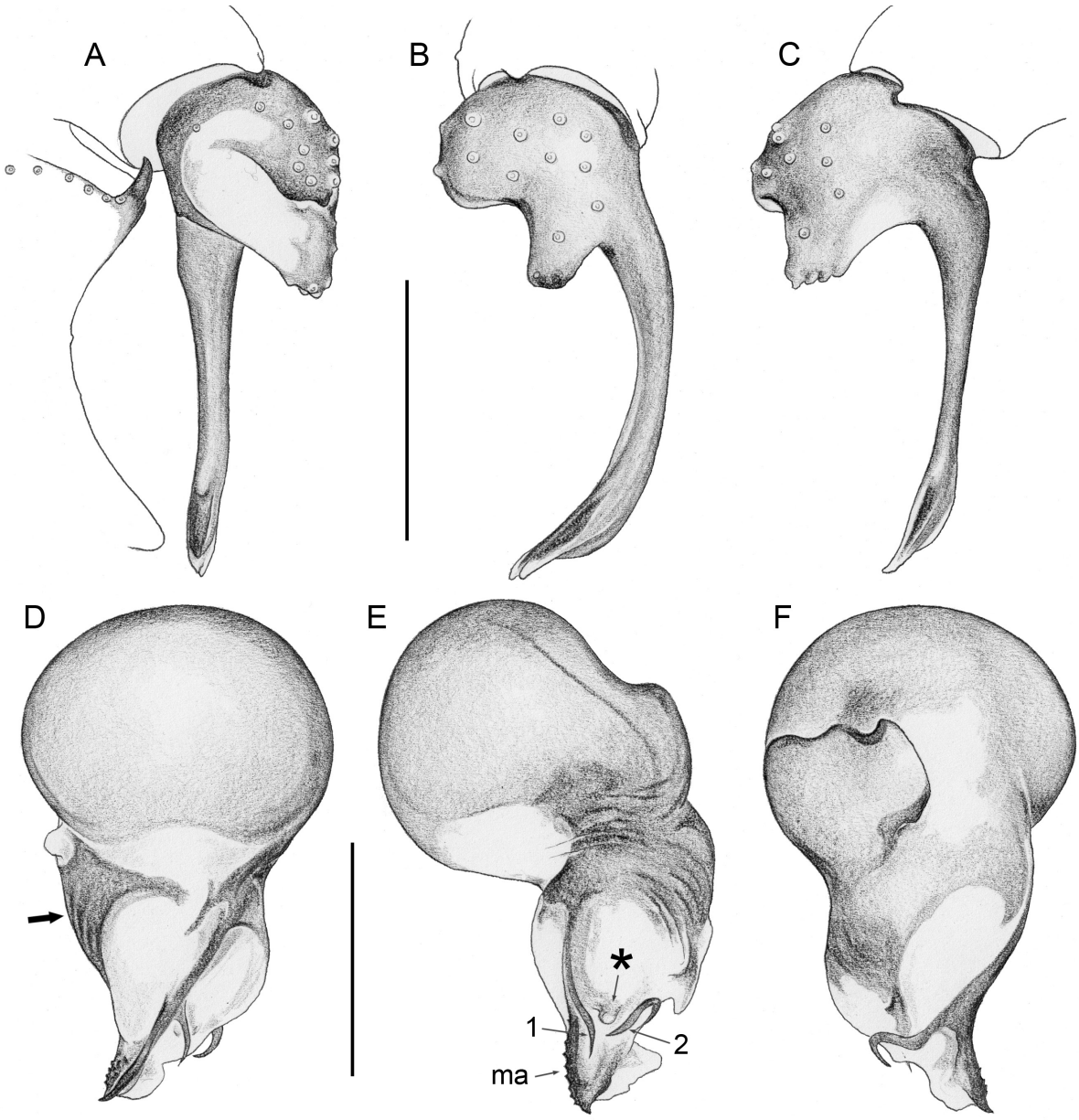

Fig. 28. *Tunda chasca* Huber gen. et sp. nov., paratype, ♂, from Ecuador, Pichincha, between San Juan and Chiriboga, ZFMK Ar 24759. **A–C**. Left palpal tarsus and procursus (in A with parts of femur) in prolateral, dorsal and retrolateral views. **D–F**. Left genital bulb in prolateral, dorsal and retrolateral views; bold arrow in D points at sclerite that is narrower in *T. ayahuma* gen. et sp. nov.; "1" and "2" denote slender bulbal processes; asterisk marks sperm duct opening. Abbreviation: ma = main distal apophysis of genital bulb. Scale lines = 0.3 mm.

Chelicerae. As in Fig. 29A–B; with pair of frontal apophyses and distinct frontal whitish area; width of chelicerae: 0.63; distance between tips of apophyses: 0.29.

Palps. As in Fig. 27; coxa with rounded retrolateral-ventral process; trochanter unmodified; femur proximally with small conical retrolateral-ventral process, distally strongly widened, with strong ventral apophysis directed distally (Fig. 28A); femur-patella condyles not shifted toward one side; tibia-tarsus condyles slightly shifted toward retrolateral side; tarsus with large dorsal process; procursus (Fig. 28A–C) proximally slender and simple, distally curved toward prolateral, with simple sclerotized and membranous elements; genital bulb (Fig. 28D–F) distally with strong main apophysis provided with small teeth and two slender processes on prolateral and dorsal sides, respectively.

Legs. With spines on femora 1 and 2: femur 1 with 2–3 long spines (250–400 μm) and ~20 short spines (70–150 μm); femur 2 with 1–2 long and ~10 short spines; spines restricted to distal halves of leg segments; with strongly curved hairs on tibiae and metatarsi, especially on legs 2 and 3, fewer on leg 1, only weakly curved hairs on leg 4; with short vertical hairs in low densities on all leg segments, especially dorsally on tibiae, in barely higher density than in females; retrolateral trichobothrium of tibia 1 at 6%; prolateral trichobothrium present on all tibiae; tarsus 1 with ~40 pseudosegments, mostly distinct (except proximally).

Female (holotype)

In general (habitus, color pattern) similar to male, but leg femora without spines and with slightly fewer short vertical hairs on all leg segments. Total body length 3.5, carapace width 1.3. Distance PME–PME 130 μm; diameter PME 140 μm; distance PME–ALE 160 μm; distance AME–AME 30 μm; diameter AME 40 μm. Leg 1: 24.5 (5.9+0.5+6.1+9.8+2.2), tibia 2: 3.8, tibia 3: 2.9, tibia 4: 4.0; tibia 1 L/d: 47. Epigynum (Fig. 30A–B) anterior plate heart-shaped, with anterior hump and posterior conical process, separated (in lateral view) by low indentation; with pair of round internal structures clearly visible in untreated specimens; posterior epigynal plate a simple arc. Internal genitalia (Figs 29C, 30C–D) with pair of oval pore plates in anterior position, connected posteriorly to sclerotized transversal band, with

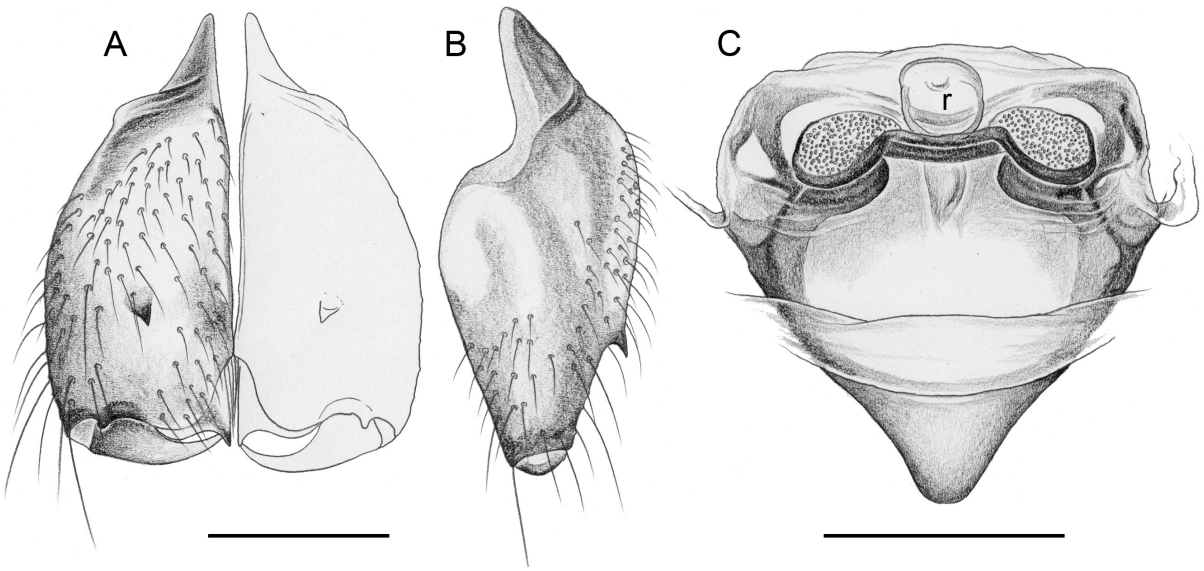

Fig. 29. *Tunda chasca* Huber gen. et sp. nov., paratypes, ♂♀, from Ecuador, Pichincha, between San Juan and Chiriboga, ZFMK Ar 24759. **A–B**. Male chelicerae, frontal and lateral views. **C**. Cleared female genitalia, dorsal view. Abbreviation: r = putative receptacle. Scale lines = 0.3 mm.

pair of rounded sclerites originating laterally and located between pore plates and ventral body wall, with median anterior 'receptacle'.

Variation

Tibia 1 in five males: 8.5–9.0 (mean 8.8); in 16 females: 5.1–6.0 (mean 5.6). Conical epigynal process variably protruding.

Barcoding

We sequenced two specimens originating from two localities (geographic distance 35 km). The intraspecific K2P distance was 3.4%. The NJ tree (Fig. 1) groups this species with the two other species lacking a female stridulatory organ. This group is nested within the clade characterized by the presence of spines on the male femora ("C" in Fig. 1), suggesting that the female stridulatory organ was lost in the most recent common ancestor of *T. chasca* gen. et sp. nov. and its two putatively closest relatives.

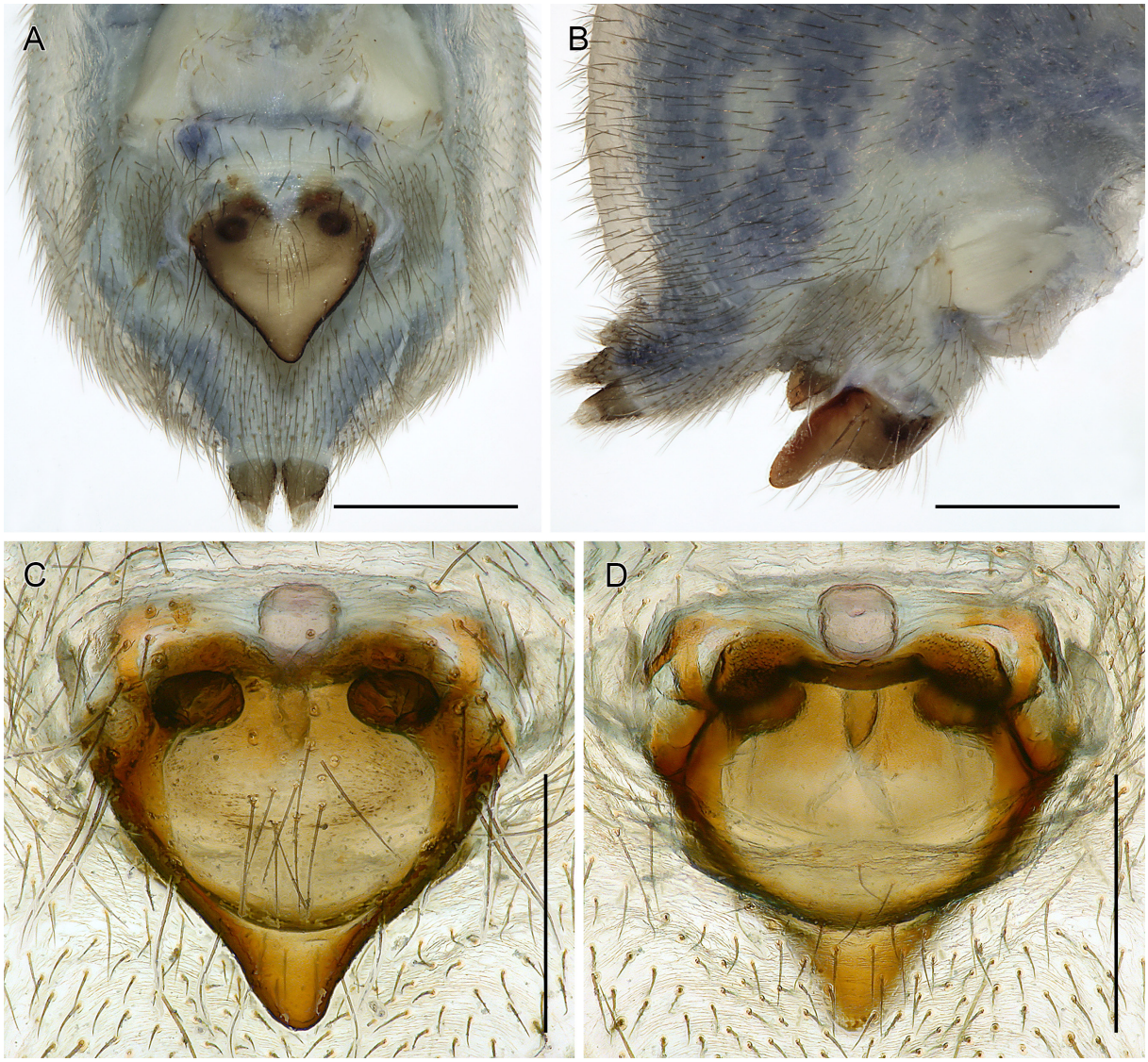

Fig. 30. *Tunda chasca* Huber gen. et sp. nov., paratype, ♀, from Ecuador, Pichincha, between San Juan and Chiriboga, ZFMK Ar 24759. **A–B**. Abdomen, ventral and lateral views. **C–D**. Cleared genitalia, ventral and dorsal views. Scale lines: A–B = 0.5 mm; C–D = 0.3 mm.

Distribution

Known from two nearby localities (distance 35 km) in the western Andean slopes of central Ecuador (Fig. 3).

Natural history

At the type locality (Fig. 4E), the spiders were collected from dark cavities at ground level among rocks near the river; the webs had a diameter of ~20 cm. Upon disturbance, the spiders ran towards the back of the cavity. A single specimen from Otonga Nature Reserve near San Francisco de Las Pampas was separated from a vial containing several species of Pholcidae and labelled "beating trees"; this specimen might have been accidentally put in this vial.

Tunda ayahuma Huber gen. et sp. nov.
urn:lsid:zoobank.org:act:0EAE5C8E-617B-4300-84DD-4068427037FD
Figs 2I–J, 31A–B, 32–33

Diagnosis

Easily distinguished from most known congeners by distinctive shape of posterior process of anterior epigynal plate (Figs 32A–B, 33A–B); epigynum of *T. chasca* gen. et sp. nov. similar but with shorter process less clearly set off and with less distinct indentation in lateral view (cf. Fig. 30A–B). From most congeners (except *T. chasca*, *T. angel* gen. et sp. nov., *T. nadineae* gen. et sp. nov.) also by male chelicerae with single pair of anterior apophyses in central position (cf. Fig. 29A; in other species in distal position or with more than one pair of apophyses). From the very similar *T. chasca* also distinguished by pore plates in female internal genitalia closer together (compare Fig. 31A–B with Fig. 29C). From *T. nadineae* also distinguished by presence of distinct lateral marks on carapace (Fig. 2I–J) and by absence of female stridulatory organ.

Etymology

Named for the Aya Huma, a mythical creature who in Ecuadorian folklore is revered for its role as a guardian spirit of nature; noun in apposition.

Type material

Holotype

ECUADOR – **Sucumbíos** • ♀; near La Bonita; 0.474° N, 77.558° W; 1870 m a.s.l.; 1 Oct. 2021; B.A. Huber and M. Herrera leg.; INABIO MECN-AR 1494.

Paratypes

ECUADOR – **Sucumbíos** • 2 ♂♂; same collection data as for holotype; INABIO MECN-AR 1495 • 5 ♂♂, together with 1 ♀ abdomen transferred from ZFMK Ecu215; same collection data as for holotype; ZFMK Ar 24760.

Other material examined

ECUADOR – **Sucumbíos** • 3 ♀♀, in pure ethanol; same collection data as for holotype; ZFMK Ecu215 (one abdomen transferred to ZFMK Ar 24760; voucher of EB120). – **Carchi** • 2 ♂♂, 1 ♀, 1 juv.; El Chical road, 'site 1'; 0.8322° N, 78.2252° W; 2200 m a.s.l.; 3 Oct. 2021; B.A. Huber and M. Herrera leg.; forest at roadside; INABIO MECN-AR 1496 • 3 ♀♀, 1 juv., in pure ethanol; same collection data as for preceding; ZFMK Ecu223 (voucher of EB128) • 3 ♂♂, 2 ♀♀; El Chical road, 'site 2'; 0.8303° N, 78.2102° W; 1830 m a.s.l.; 3 Oct. 2021; B.A. Huber and M. Herrera leg.; forest at roadside; ZFMK Ar 24761 • 2 ♀♀, 1 juv., in pure ethanol; same collection data as for preceding; ZFMK Ecu225 (voucher of EB130).

Description

Male (paratype, ZFMK Ar 24760)

Measurements. Total body length 4.2, carapace width 1.7. Distance PME–PME 190 µm; diameter PME 160 µm; distance PME–ALE 140 µm; distance AME–AME 35 µm; diameter AME 55 µm. Leg 1: 33.8 (8.5+0.7+8.8+13.5+2.3), tibia 2: 6.1, tibia 3: 4.9, tibia 4: 6.0; tibia 1 L/d: 49; leg femur 2 slightly thicker than others (0.35 vs 0.29–0.30); diameters of leg tibiae 0.18–0.19.

Color (in ethanol). Prosoma pale ochre with wide dark brown lateral bands and median band including ocular area; lateral bands not connected with median band posteriorly, clypeus with pair of parallel wide bands, sternum monochromous brown, only near coxae 1 and 2 lighter; legs brown, tips of femora and tibiae lighter, without darker rings; abdomen bluish-gray with darker bluish internal marks dorsally and laterally, ventrally with brown plate in front of gonopore and small bluish internal mark behind gonopore.

Body. Habitus as Fig. 2I. Ocular area strongly raised. Carapace with deep thoracic groove. Clypeus unmodified. Sternum wider than long (1.10/0.70), unmodified. Abdomen barely longer than high, pointed at spinnerets.

Chelicerae. Very similar to *T. chasca* gen. et sp. nov. (cf. Fig. 29A–B) but without distinct whitish frontal area (only slightly lighter proximally); width of chelicerae: 0.68; distance between tips of apophyses: 0.28.

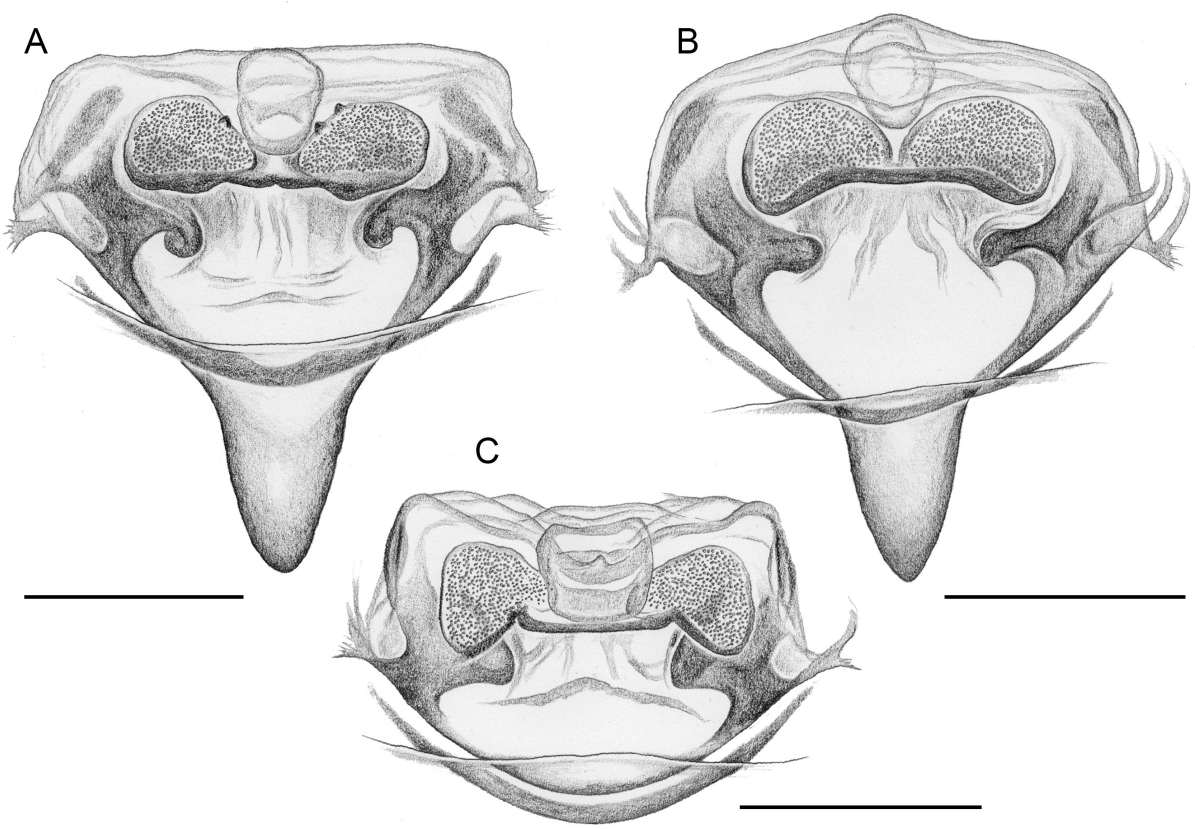

Fig. 31. *Tunda* spp., cleared female genitalia, dorsal views. **A–B**. *Tunda ayahuma* Huber gen. et sp. nov., paratype, ♀, from Ecuador, Sucumbíos, near La Bonita (A; ZFMK Ar 24760) and non-type, ♀, from Carchi, El Chical road, 'site 2' (B; ZFMK Ar 24761). **C**. *Tunda angel* Huber gen. et sp. nov., paratype, ♀, from Ecuador, Carchi, near El Ángel, ZFMK Ar 24762. Scale lines = 0.3 mm.

Palps. Very similar to *T. chasca* gen. et sp. nov. (cf. Fig. 27) but slightly larger (e.g., tibia length/width: 0.51/0.26 vs 0.44/0.22; bulb length: 0.72 vs 0.65); procursus identical (cf. Fig. 28A–C); genital bulb mostly identical (cf. Fig. 28D–F), only main distal apophysis (ma in Fig. 28E) slightly wider in dorsal view, and ventral sclerite (bold arrow in Fig. 28D) slightly narrower.

Legs. With spines on femora 1 and 2: femur 1 with 3–4 long spines and ~18 short spines; femur 2 with 1–2 long and ~10 short spines; spines restricted to distal halves of leg segments; with strongly curved hairs on tibiae 1–4 and on metatarsi 1–3, with weakly curved hairs on femora; with short vertical hairs in low densities on all leg segments, especially dorsally on tibiae, in barely higher density than in females;

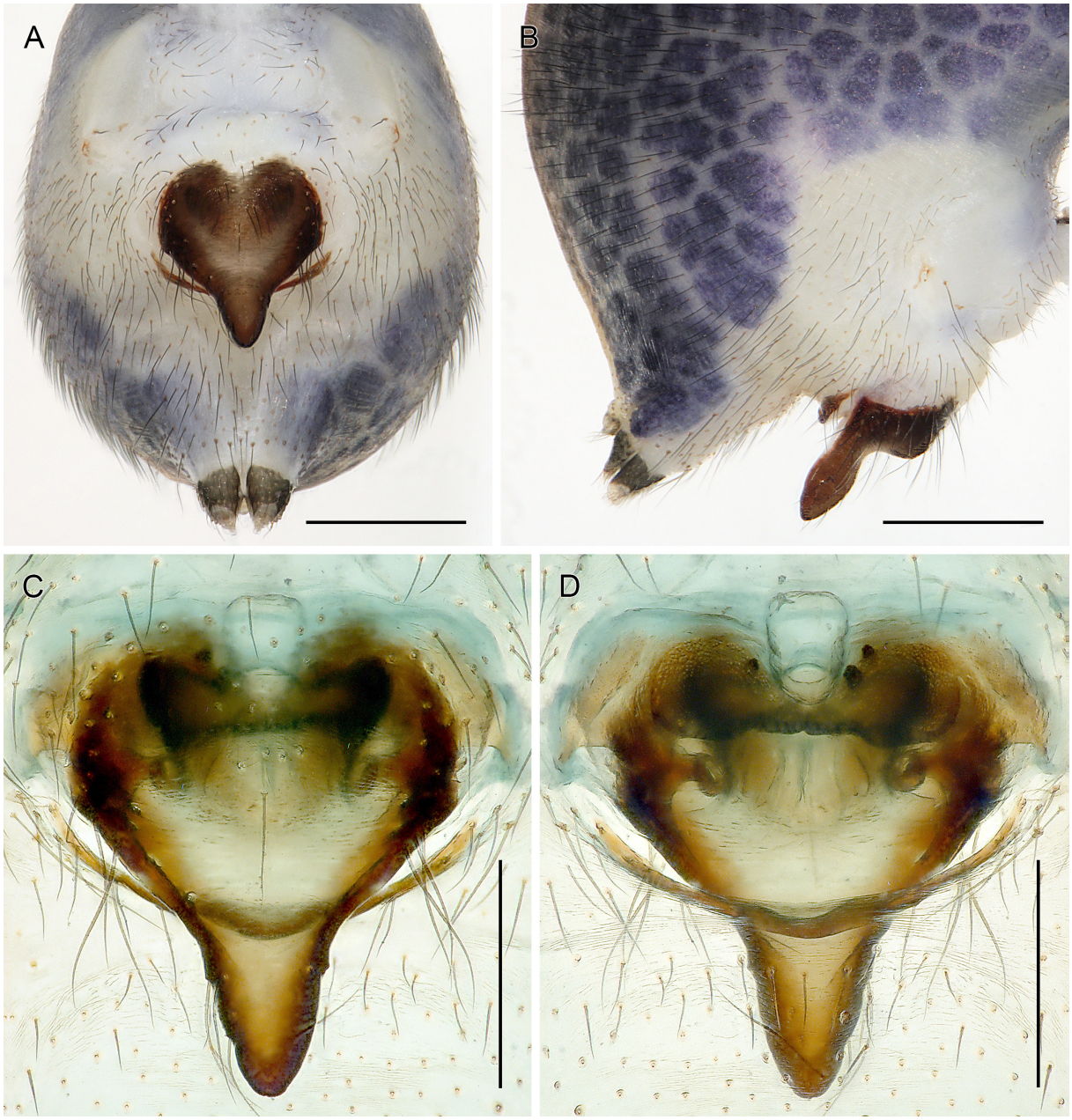

Fig. 32. *Tunda ayahuma* Huber gen. et sp. nov., paratype, ♀, from Ecuador, Sucumbíos, near La Bonita, ZFMK Ar 24760. **A–B**. Abdomen, ventral and lateral views. **C–D**. Cleared genitalia, ventral and dorsal views. Scale lines: A–B = 0.5 mm; C–D = 0.3 mm.

retrolateral trichobothrium of tibia 1 at 6%; prolateral trichobothrium present on all tibiae; tarsus 1 with ~30 pseudosegments, mostly distinct (except proximally).

Female (holotype)
In general (habitus, color pattern) similar to male, but leg femora without spines and with slightly fewer short vertical hairs on all leg segments. Total body length 3.4, carapace width 1.4. Distance PME–PME

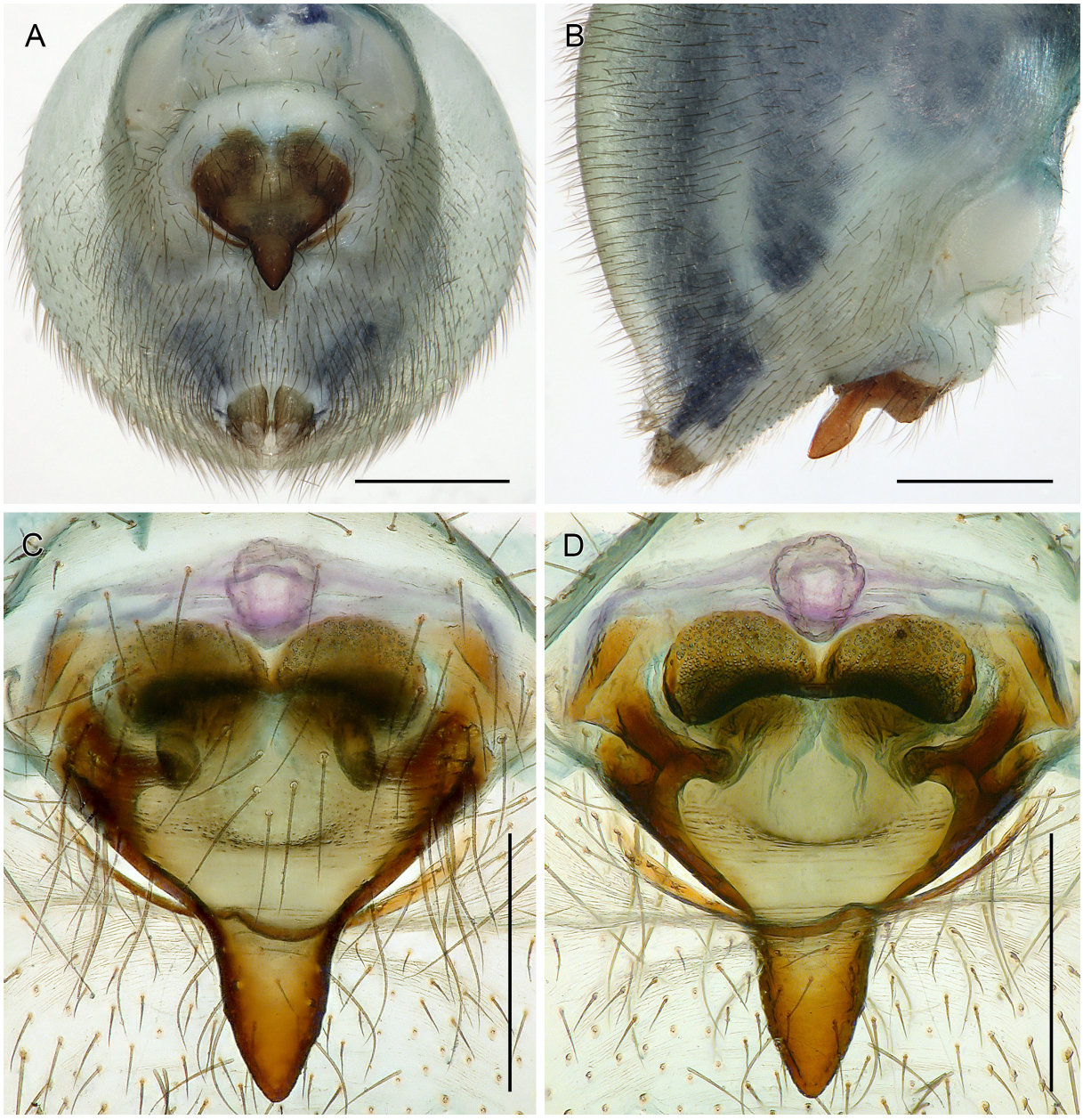

Fig. 33. *Tunda ayahuma* Huber gen. et sp. nov., ♀, from Ecuador, Carchi, El Chical road, 'site 2', ZFMK Ar 24761. **A–B**. Abdomen, ventral and lateral views. **C–D**. Cleared genitalia, ventral and dorsal views. Scale lines: A–B = 0.5 mm; C–D = 0.3 mm.

130 µm; diameter PME 150 µm; distance PME–ALE 110 µm; distance AME–AME 20 µm; diameter AME 40 µm. Leg 1: 24.2 (5.9+0.5+6.2+9.3+2.3), tibia 2: 4.1, tibia 3: 3.1, tibia 4: 4.1; tibia 1 L/d: 44. Epigynum (Fig. 32A–B) anterior plate heart-shaped, with anterior hump and long posterior process, separated (in lateral view) by deep indentation; posterior epigynal plate a simple arc. Internal genitalia (Figs 31A, 32C–D) with pair of large pore plates in anterior position, connected posteriorly to sclerotized transversal band, with rounded sclerites originating laterally, and median anterior 'receptacle'.

Variation

Tibia 1 in twelve males: 8.0–9.7 (mean 8.9); males from near La Bonita (N = 7) slightly larger than males from El Chical road (N = 5) (8.9–9.7 vs 8.0–8.7). Tibia 1 in ten females: 4.9–6.8 (mean 6.1); females from near La Bonita (N = 4) slightly larger than females from El Chical road (N = 6) (6.1–6.8 vs 4.9–6.4). One measured male from El Chical road with very similar palp size (tibia length/width: 0.50/0.26) but slightly smaller chelicerae (width: 0.61; distance between tips of apophyses: 0.25). Smallest males without spines on leg femora. Posterior epigynal process variably protruding. Cleared female from El Chical road very similar to cleared female from type locality but with pore plates slightly closer together (Fig. 33).

Barcoding

We sequenced three specimens, two of them from neighboring sites in Carchi and one topotypical specimen from Sucumbíos (geographic distance 83 km) (Table 1). The intraspecific K2P distance between the geographically neighboring specimens was 2.5%; their distances to the topotypical specimens were 8.4 and 8.8% (Table 2). This is at the same level as the K2P distances to the sequenced specimen of *T. angel* gen. et sp. nov. (6.7–8.9%), resulting in a paraphyletic *T. ayahuma* gen. et sp. nov. in the NJ tree (Fig. 1). These results conflict with morphology, where the epigyna of specimens we assign to *T. ayahuma* are almost indistinguishable but very different from those of *T. angel*.

Distribution

Known from two localities (distance ~80 km) in northern Ecuador (Fig. 3).

Natural history

At the type locality (Fig. 4F), the spiders were found hidden deeply in dark holes in the ground of a humid forest near a river. Most specimens were found in a single cavity (~10 × 30 × 20 cm) that contained ~10 adult specimens. At El Chical, the spiders were relatively easy to locate by their webs, but difficult to access very deep in the back of the holes. One egg-sac (in ZFMK Ar 24761) had approximately 10 of its 20 eggs parasitized (presumably by a *Baeus* Haliday, 1833 wasp).

Tunda angel Huber gen. et sp. nov.
urn:lsid:zoobank.org:act:B8DCCD16-7001-4B15-92B0-8872D7309648
Figs 31C, 34

Diagnosis

Distinguished from known congeners by short legs (male tibia 1 ≤ 6 mm; female tibia 1 ≤ 4 mm) and by shape of epigynal plate (Fig. 34A–B; without posterior process as in most similar relatives *T. chasca* gen. et sp. nov. and *T. ayahuma* gen. et sp. nov.). From most congeners (except *T. chasca* and *T. ayahuma*) also distinguished by absence of female stridulatory organ. From most congeners (except *T. chasca*, *T. ayahuma*, *T. nadineae* gen. et sp. nov.) also by male chelicerae with single pair of anterior apophyses in central position (cf. Fig. 29A; in other species in distal position or with more than one pair of apophyses). From *T. nadineae* also distinguished by presence of distinct lateral marks on carapace (cf. Fig. 2I–J).

Etymology

The species name is derived from the type locality, noun in apposition.

Type material

Holotype

ECUADOR – **Carchi** • ♀; near El Ángel; 0.6178° N, 77.9261° W; 3240 m a.s.l.; 2 Oct 2021; B.A. Huber and M. Herrera leg.; INABIO MECN-AR 1497.

Paratypes

ECUADOR – **Carchi** • 1 ♂; same collection data as for holotype; INABIO MECN-AR 1498 • 1 ♀; same collection data as for holotype; ZFMK Ar 24762.

Other material examined

ECUADOR – **Carchi** • 1 ♂, 1 ♀ (abdomen transferred to ZFMK Ar 24762), 2 juvs, in pure ethanol; same collection data as for holotype; ZFMK Ecu221 (voucher of EB126).

Description

Male (paratype, INABIO MECN-AR 1498)

Measurements. Total body length 3.3, carapace width 1.3. Distance PME–PME 160 μm; diameter PME 100 μm; distance PME–ALE 90 μm; distance AME–AME 20 μm; diameter AME 30 μm. Leg 1: 18.8 (4.8+0.5+5.0+6.9+1.6), tibia 2: 3.7, tibia 3: 2.9, tibia 4: 3.7; tibia 1 L/d: 38; leg femora 1 and 2 slightly thicker than others (0.25 vs 0.23); diameters of leg tibiae 0.13–0.14.

Color (in ethanol). Prosoma pale ochre with wide dark brown lateral bands and median band including ocular area; lateral bands not connected with median band posteriorly, clypeus with brown mark not divided medially, sternum monochromous brown, only near coxae 1 and 2 lighter; legs brown, without light or dark rings; abdomen bluish-gray with darker bluish internal marks dorsally and laterally, ventrally with brown plate in front of gonopore and small bluish internal mark behind gonopore.

Body. Habitus as in *T. ayahuma* gen. et sp. nov. (cf. Fig. 2I). Ocular area strongly raised. Carapace with deep thoracic groove. Clypeus unmodified. Sternum wider than long (0.90/0.55), unmodified. Abdomen barely longer than high, pointed at spinnerets.

Chelicerae. Very similar to *T. chasca* gen. et sp. nov. (cf. Fig. 29A–B) but without distinct whitish frontal area (only slightly lighter proximally); width of chelicerae: 0.56; distance between tips of apophyses: 0.21.

Palps. Very similar to *T. chasca* gen. et sp. nov. (cf. Fig. 27) including size; procursus identical (cf. Fig. 28A–C); genital bulb mostly identical (cf. Fig. 28D–F), only main distal apophysis (ma in Fig. 28E) slightly wider in dorsal view.

Legs. With spines on femur 1 only: one long spine and ~8 short spines; with strongly curved hairs on tibiae and metatarsi, especially on legs 2 and 3, fewer on leg 1; with weakly curved hairs on femora 1–3 and on tibia and metatarsus of leg 4; with short vertical hairs in low densities on all leg segments, especially dorsally on tibiae, in barely higher density than in females; retrolateral trichobothrium of tibia 1 at 8%; prolateral trichobothrium present on all tibiae; tarsus 1 with ~25 pseudosegments, mostly distinct (except proximally).

Female (holotype)

In general (habitus, color pattern) similar to male, but leg femora without spines and with slightly fewer short vertical hairs on all leg segments. Total body length 2.8, carapace width 1.15. Distance PME–PME

120 µm; diameter PME 100 µm; distance PME–ALE 90 µm; distance AME–AME 20 µm; diameter AME 40 µm. Leg 1: 13.6 (3.4+0.4+3.6+4.7+1.5), tibia 2: 2.5, tibia 3: 2.0, tibia 4: 2.7; tibia 1 L/d: 24. Epigynum (Fig. 34A–B) anterior plate trapezoidal with curved posterior margin, with anterior hump, without posterior process; posterior epigynal plate a simple arc. Internal genitalia (Figs 31C, 34C–D) with pair of large pore plates in anterior position, connected posteriorly to sclerotized transversal band, with pair of rounded lateral sclerites originating laterally, with median anterior 'receptacle'.

Variation

Tibia 1 in other male: 5.7; in two other females: 3.8, 4.0.

Barcoding

We sequenced one specimens from the type locality. The K2P distances to the sequenced *T. ayahuma* gen. et sp. nov. specimens were surprisingly low considering the very different epigyna (6.7–8.9%) (Table 2).

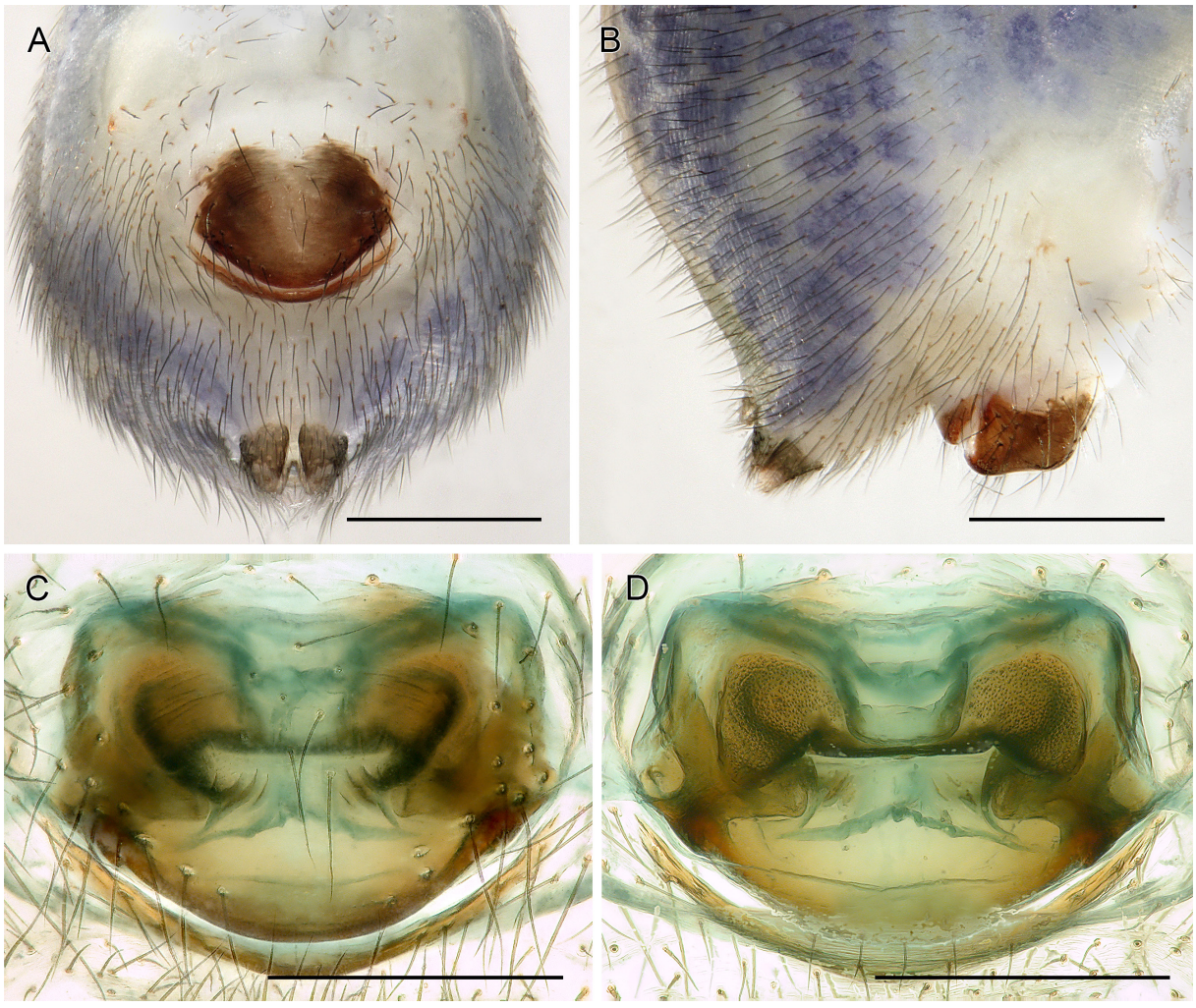

Fig. 34. *Tunda angel* Huber gen. et sp. nov., paratype, ♀, from Ecuador, Carchi, near El Ángel, ZFMK Ar 24762. **A–B**. Abdomen, ventral and lateral views. **C–D**. Cleared genitalia, ventral and dorsal views. Scale lines: A–B = 0.5 mm; C–D = 0.3 mm.

Distribution

Known from type locality only, in northern Ecuador (Fig. 3).

Natural history

The spiders were found in a degraded forest in a ravine, in relatively dry holes under dense vegetation. This microhabitat was shared with *Waunana tulcan* Huber, 2000.



Fig. 35. Comparative plate of female abdomens in ventral views; for specimen details, see Figs 8, 10, 14, 18, 22, 26, 30, 32, 34. **A**. *Tunda icazai* Huber gen. et sp. nov. **B**. *T. pachoca* Huber gen. et sp. nov. **C**. *T. nadineae* Huber gen. et sp. nov. **D**. *T. totoro* Huber gen. et sp. nov. **E**. *T. muki* Huber gen. et sp. nov. **F**. *T. otonga* Huber gen. et sp. nov. **G**. *T. chasca* Huber gen. et sp. nov. **H**. *T. ayahuma* Huber gen. et sp. nov. **I**. *T. angel* Huber gen. et sp. nov. Scale lines: A = 0.3 mm; B–I = 0.5 mm.

Discussion

Communication via substrate-borne mechanical waves such as those produced by stridulation, drumming, or tremulation, is common in arthropods, has evolved convergently many times, and involves a wide range of body parts and structures (Cocroft & Rodríguez 2005; Wessel 2005; Davranoglou *et al.* 2023; Forthman *et al.* 2023; Virant-Doberlet *et al.* 2023). In spiders, stridulation is particularly noticeable in tarantulas and a few other cases where it has an air-borne audible component (e.g., Hinton & Wilson 1970; Gwynne & Dadour 1985; Marshall *et al.* 1995; Sweger & Uetz 2016), but stridulation is in fact known to occur in many spider families (Legendre 1963; Starck 1985; Jocqué 2005; Davranoglou *et al.* 2023). As in other arthropods, spider stridulation has evolved many times independently (conservative estimate in Davranoglou *et al.* 2023: 57 times) and it may involve almost any pair of structures capable of being rubbed or moved against each other (Starck 1985; Jocqué 2005).

In Pholcidae, the systematically most widespread type of stridulatory organ consists of a modified (short, thick) hair on the palpal femur scraping over a file of ridges on the chelicera. This organ occurs in several subfamilies and may well be a plesiomorphic character for the family, as tentatively suggested by Davranoglou *et al.* (2023). It may occur in only one sex (most often the male) or in both sexes; in the latter case, the files are often sexually dimorphic (Huber 2021). The few studies that have focused on the function of cheliceral stridulation in Pholcidae suggest intersexual communication; in males, it seems to have a luring function whereas in females it seems to convey a negative message (Peretti *et al.* 2006; Dutto *et al.* 2011; Calbacho-Rosa *et al.* 2019). A particularly intriguing aspect of this stridulatory system concerns its systematic distribution: it is almost completely absent in the two species-rich subfamilies, Modisiminae and Pholcinae. Except for a few species of *Metagonia* Simon, 1893 (see Huber 1998, 2000; Huber *et al.* 2022), cheliceral stridulatory files are not known in these two subfamilies, which together comprise 81% of all described species of Pholcidae.

In stark contrast to this presumably plesiomorphic cheliceral stridulation is the second type of stridulation in Pholcidae that involves contact between the prosoma and the abdomen. This type may be paired or unpaired, dorsal or ventral, and it occurs in distantly related genera, suggesting multiple convergent origins (Huber 2021: at least 11 origins in Pholcidae). This organ typically consists of one or two processes on the carapace acting against one or two plates on the abdomen. Because these plates are not striated, the mechanism is not stridulatory in the strict sense, i.e., involving "friction" between body parts (Uetz & Stratton 1982; Virant-Doberlet *et al.* 2023), or "rubbing" (Jocqué 2005; Davranoglou *et al.* 2023). It might be better described as "drumming" or "percussion", but these terms are more commonly used for cases where body parts strike against the substrate (e.g., Virant-Doberlet *et al.* 2023). Terminological issues aside, the most remarkable aspect is that this kind of signaling has evolved almost exclusively in females: character mapping suggests ten independent origins in females but only one in males (Huber 2021).

The present case of female stridulation between abdomen and femora 4 constitutes a third type of stridulatory organ, previously unknown in Pholcidae. Similar organs have been described in a few other spider families (often called "type g" organs, following the system proposed by Legendre 1963), but in those cases they are usually confined to – or more prominent in – males (e.g., Kronestedt 1973; Ramírez *et al.* 2001; Álvarez-Padilla & Hormiga 2011; Dupérré & Tapia 2015), and they usually are composed of one or more "scrapers" on the femur acting against a file located on the book-lung cover (Hinton & Wilson 1970; Kronestedt 1973; Scharff & Coddington 1997). The morphologically most similar case known to us involves representatives of the genus *Olbus* Simon, 1880 (Corinnidae), where a ridge on femur 4 acts against a field of modified hair bases on the abdomen (Ramírez *et al.* 2001). To our knowledge, two rows or bands of modified hair bases that are rubbed against each other have not previously been described in spiders.

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Author contributions

BAH: initiation of project, funding acquisition, collecting, taxonomy, writing.
GM: curation and analysis of molecular data, writing.
JCC: permits, logistics, collecting, writing.

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