



Monograph

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Taxonomic revision and cladistic analysis of ghost spiders of the genus *Tafana* Simon, 1903 (Araneae: Dionycha, Anyphaenidae), with the descriptions of twelve new species

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Abstract. The diversity of the genus *Tafana* Simon, 1903 is poorly known in the Neotropical regions. In this work we provide a taxonomic review of the genus as well as a phylogenetic analysis. The ingroup of the analysis is composed of sixteen species of *Tafana* and the outgroup is composed of five representatives of Anyphaenidae. The sister-group recovered for *Tafana* is the clade *Aysha* + *Xiruana*, being supported by the embolic process on the male bulb. Two species groups within *Tafana* are herein proposed, the *silhavyi* group and the *riveti* group, based on two exclusive synapomorphies in the male bulb. We redescribe *Tafana quelchi* and present a description of the previously unknown female of *Tafana silhavyi*, both from Venezuela. In addition, we describe the first adult specimens of *Tafana straminea*. Twelve new species, along with several previously described species, are described, illustrated and mapped: *T. riveti*, *T. straminea*, *T. quelchi*, *T. kunturmarqa* sp. nov., *T. humahuaca* sp. nov., *T. pastaza* sp. nov., *T. nevada* sp. nov., *T. huatanay* sp. nov. and *T. ruizi* sp. nov. from the *riveti* species group; *T. maracay* sp. nov., *T. arawak* sp. nov., *T. chimire* sp. nov. and *T. pitieri* sp. nov. from the *silhavyi* species group; *T. oliviae* sp. nov. from Argentina and *T. orinoco* sp. nov. from Venezuela, neither of which belongs to any species group. We also discuss the genital morphology of the species groups based on the results of the phylogenetic analysis. Furthermore, distribution maps for all species, including new records for *T. riveti*, *T. straminea* and *T. quelchi*, are presented.

Keywords. Anyphaeninae, taxonomy, Neotropical region.

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Introduction

Spiders of the family Anyphaenidae Bertkau, 1878 are known as ghost spiders because of their rapid movement. They frequently inhabit leaf-litter, and are found up to the treetops in forests and even in

some semi-arid regions (Brescovit 1997; Labarque *et al.* 2015). Currently, the family is divided in the subfamilies Amaurobioidinae Hickman, 1949 and Anyphaeninae Bertkau, 1878 (Ramírez 2003, 2014).

The subfamily Amaurobioidinae has been widely studied in the morphological and molecular phylogenetic analyses of Ramírez (1995a, 1995b, 2003, 2007), Ramírez *et al.* (2004), Werenkraut & Ramírez (2009), González Márquez & Ramírez (2012), Laborda *et al.* (2013), Labarque *et al.* (2015) and Rúbio & Ramírez (2015); and in the biogeographic analyses of Ceccarelli *et al.* (2016, 2019) and Soto *et al.* (2017). Currently, the subfamily comprises 23 genera and 171 species, with representatives in the Americas, South Africa, Tasmania (Australia) and New Zealand (Ramírez 2003; World Spider Catalog 2020). So far, Anyphaeninae has only been studied using morphological characters, by Brescovit (1991a, 1991b, 1992a, 1992b, 1993a, 1993b, 1997, 1999), Oliveira & Brescovit (2015a, 2015b, 2016) and Brescovit & Oliveira (2019). Brescovit (1997) revised and redescribed all known genera of the subfamily in the Neotropical region. Currently, Anyphaeninae includes 32 genera and 385 species, and is widely distributed throughout the Americas, with representatives in the Palearctic, Oriental and Polynesian regions (World Spider Catalog 2020).

The genus *Tafana* was proposed by Simon (1903) with *Tafana riveti* Simon, 1903 as the type species. Brescovit (1997) redescribed *T. riveti* and transferred three additional species from *Anyphaena* Sundevall, 1833 to *Tafana*: *T. quelchi* (Pocock, 1895), *T. silhavyi* (Caporiacco, 1955) and *T. straminea* (L. Koch, 1866). *Tafana* is easily distinguished from other genera of Anyphaeninae by an apophysis at the base of the embolus, a ventral tegular process near the median apophysis and in the margin of the tegulum on the male palp, as well as a female epigynum with sinuous and transversal sclerotized lateral lobes, and an atrium with or without a septum in the female genitalia.

In this contribution, we present a phylogenetic analysis of the genus and propose two distinct species groups, the *riveti* group and the *silhavyi* group. The genus *Tafana* is revised with the description of twelve new species, and descriptions are provided for the previously unknown female of *Tafana silhavyi* and adult specimens of *Tafana straminea*. We also provide a new diagnosis of the genus and a diagnosis for all the species herein reviewed.

Material and methods

The examined specimens are deposited in the following collections (curators in parentheses):

AMNH	=	American Museum of Natural History, New York, USA (L. Prendini)
CAS	=	Californian Academy of Sciences, San Francisco, USA (L. Esposito)
FMNH	=	Field Museum of Natural History, Chicago, USA (P. Sierwald)
IBNP	=	Inventario Biológico Nacional, Museo Nacional de Historia Natural del Paraguay, San Lorenzo, Paraguay (J.A. Kochalka)
IBSP	=	Instituto Butantan, São Paulo, Brazil (A.D. Brescovit)
ICN-Ar	=	Universidad Nacional de Colombia, Instituto de Ciencias Naturales, Bogotá, Colombia (E. Florez)
MACN-Ar	=	Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires, Argentina (M. Ramírez)
MCN	=	Museu de Ciências Naturais, SEMA, Porto Alegre, Brazil (R. Ott)
MCZ	=	Museum of Comparative Zoology, Harvard University, Cambridge, USA (G. Giribet)
MIZA	=	Museo del Instituto de Zoología Agrícola, Universidad Central de Venezuela, Aragua, Venezuela (F.F. Yépez)
MNHN	=	Muséum national d’histoire naturelle, Paris, France (C. Rollard)
MUCV	=	Museo de Biología, Universidad Central de Venezuela, Caracas, Venezuela (R. Candia)
MUSM	=	Museo de Historia Natural de San Marcos, Lima, Peru (D. Silva)
USNM	=	National Museum of Natural History, Smithsonian Institution, Washington D.C., USA (J. Coddington and H. Wood)

Morphology

Specimens described in this work were examined in the Laboratório de Coleções Zoológicas, Instituto Butantan. All measurements are in millimeters. The terminology and format of the descriptions follow Oliveira & Brescovit (2015a, 2015b). Descriptions of the leg. spination mention only those spines which differ from the general formula presented by Brescovit (1997: 84–85). The male and female genitalia were examined and illustrated using an M125 Leica stereo microscope with lucida camera. All drawings were scanned and edited with the help of the program Photoshop CS6. Extended focal range photos were taken using a Leica 500 digital camera attached to a Leica MZ16A stereo microscope. The photographs were assembled using Leica Application Suite ver. 3.3.0. Descriptions of the process of the male palp expansion follow Brescovit (1997: 6). Tracheae were observed and photographed after digestion of tissues with a 10–20% KOH solution at approximately 100°C in a double boiler or on a hot plate. After dissection, in order to photograph, the female genitalia, the vulva, was submerged for 24 hours in one tablet of an enzymatic eye lens cleaner (*Ultrazyme® enzymatic cleaner*) diluted in 5 mL of distilled water, to digest the non-chitinous tissue, before being submerged in clove oil for clarification. For scanning electron microscopy (SEM) images, legs, carapace, chelicerae, palpi and epigynum were removed and dehydrated through a series of graded ethanol (80–100%), dried by critical-point drying, mounted on metal stubs using adhesive copper tape and nail polish for fixation, and sputter coated with gold. SEM images were taken with a FEI Quanta 250 scanning electron microscope at the Laboratório de Biologia Celular of the Instituto Butantan, São Paulo. Geographical coordinates are given as latitude and longitude (DMS); coordinates in brackets were obtained with Google Earth (Lat/Lon-WGS84) and Google Maps. The geographic distribution of each species was mapped using the software ArcMap ver. 10.1.

Abbreviations

Somatic morphology

Ac	=	aciniiform gland spigot
ALE	=	anterior lateral eyes
ALS	=	anterior lateral spinnerets
AME	=	anterior median eyes
CL	=	colulus
MaAm	=	major ampullate gland spigot
MiAm	=	minor ampullate gland spigot
Pi	=	piriform gland spigot
p	=	prolateral
PLE	=	posterior lateral eyes
PLS	=	posterior lateral spinnerets
PME	=	posterior median eyes
PMS	=	posterior median spinnerets
r	=	retrolateral
Tp	=	tartipore
TrSp	=	tracheal spiracle
v	=	ventral
1stB	=	first bifurcation of median tracheae

Genitalia (♂)

ABE	=	apophysis at the base of embolus
APE	=	apophysis of embolic process
aPTA	=	apical prolateral tibial apophysis
aRTA	=	anterior branch of the retrolateral tibial apophysis
BH	=	basal haematodocha

bTP	=	basal tegular protuberance
C	=	cymbium
Co	=	conductor
E	=	embolus
EP	=	embolic process
F	=	fundus
MA	=	median apophysis
MH	=	median haematodocha
MTA	=	median tibial apophysis
pABE	=	primary apophysis at the base of the embolus
pRTA	=	posterior branch of the retrolateral tibial apophysis
P	=	petiole
PA	=	patellar apophysis
RP	=	retrolateral projection
RTA	=	retrolateral tibial apophysis
sABE	=	secondary apophysis at the base of the embolus
SD	=	sperm duct
ST	=	subtegulum
T	=	tegulum
VTP	=	ventral tegular process

Genitalia (♀)

A	=	atrium
AS	=	atrial septum
CD	=	copulatory ducts
CG	=	cuticular glands
CO	=	copulatory opening
FD	=	fertilization ducts
GD	=	gland ducts
LL	=	lateral lobes (= borda lateral in Brescovit 1997: 11; lateral lobe in Ramírez 2003: 7)
H	=	hood (= aba in Brescovit 1997: 11; epigynal flap in Duppéré & Tapia 2016: 4)
S1	=	primary spermatechae
S2	=	secondary spermathecae (= receptáculos seminais in Brescovit 1997: 12; accessory bulbs in Ramírez 2003: 7)

Phylogenetic analysis

All 16 recognized species in the genus *Tafana* (12 described in this work and 4 described previously), were included in the cladistic analysis. The outgroup selection was based on the phylogenetic hypothesis by Ramírez (2003) and taxonomic studies of Brescovit (1997) on Anyphaenidae. *Arachosia praesignis* (Keyserling, 1891) (Amaurobioidinae) was used to root the phylogeny. Our other outgroups consist of *Anyphaena accentuata* (Walckenaer, 1802), *Patrera fulvastra* (Simon, 1903), *Ayscha prospera* (Keyserling, 1891) and *Xiruana gracilipes* (Keyserling, 1891), all Anyphaeninae. The list of material examined is available in Appendix 1.

A total of 43 parsimony-informative morphological characters were used (Appendix 2). They refer to the cephalothorax (3 characters), chelicerae (2), scopulae (1), spines (1), tracheae (1), male palp (6), copulatory bulb (15) and female genitalia (14). Sixteen of these characters were scored based on previous phylogenetic analyses by Ramírez (2003, 2014) and Azevedo *et al.* (2018).

The characters were defined following Sereno (2007). They are all binary except for four multi-state, non-additive characters (Fitch 1971). The character matrix (Appendix 3) was constructed in Excel 2013, edited in Notepad++ and saved in TNT format. Non-applicable states were scored as ‘-’ and unknown states as ‘?’.

Heuristic searches for the most parsimonious trees (MPTs) were carried out in TNT ver. 1.5 (Goloboff & Catalano 2016), under equal weighting (EW) in “traditional search”, with 300 being the number of additional sequences, followed by rounds of tree bisection reconnection (TBR) saving 100 trees per replication. To analyze concordance between characters and their effect on the tree topologies, we performed a sensitivity analysis (Goloboff 2008) on different values of the constant of concavity (k) for implied weighting (IW). The similarity between topologies recovered by EW and IW (Appendix 3) was quantified using subtree pruning and regrafting (SPR-distances) (Goloboff 2008). Branch supports were estimated by Goodman-Bremer support (BS) (Goodman *et al.* 1982; Bremer 1988, 1994) and relative Bremer support (RB) (Goloboff & Farris 2001), searching for suboptimal trees with 1–10 steps more than the MPTs and retaining 1000–10000 trees, respectively (*sub 1 hold 1000; bb = tbr fillonly; unique**); and also by symmetric resampling (SR) (Goloboff *et al.* 2003). The SR support was quantified by means of 4000 pseudo-replicates with 4000 RAS followed by TBR, saving 100 trees per replication, with a probability of elimination (P) = 0.33. Character optimization was performed in Winclada ver. 1.00.08 (Nixon 2002) and when state changes were ambiguous ACCTRAN (accelerated transformation) was utilized. The final topologies were modified for publication in Photoshop CS6.

Results

Phylogeny

In the analysis under equal weighing a most parsimonious tree was obtained with 106 steps (CI = 47; RI = 61). The genus *Tafana* was recovered as a monophyletic group with support (BS = 3, RB = 50%, SR = 45%) (Fig. 1).

In the sensitivity analysis using different values of the concavity constant (k) for implied weighting of characters, different k values result in different numbers of MPTs and steps. These results are provided in Table 1.

The analysis under implied weighting resulted in four similar topologies (Fig. 2). The main difference between the trees involves the relationships and monophyly of *Tafana orinoco* sp. nov. and clade G (Figs 2, 5). We decided to choose the tree obtained with $k = 7$, because it shares the highest number of nodes with the other trees and was considered the most stable (Figs 2, 5). The analysis with $k = 7$ resulted in one MPT with total fit 27.319 (CI = 0.46; RI = 0.60). Support values and sensitivity of this tree to concavity changes are presented in Figs 3 and 4. The synapomorphies of *Tafana* and its internal clades are listed in Table 2.

In the chosen tree ($k = 7$), and indeed in all tree topologies recovered in the sensitivity analysis, *Tafana* Simon, 1903 was recovered as a monophyletic group (Figs 4–5). The genus has five unambiguous synapomorphies. Four of these are exclusive synapomorphies (Fig. 5, Clade A): presence of an apophysis at the base of the embolus (character 23[1]); presence of an anterior fold with the posterior extension forming the lateral lobes (character 31[1], several reversals within the genus); the sinuous shape of lateral lobes of the epigynum (character 32[1]); region of epigynum covered by cuticle (character 36[1]). One is a homoplastic synapomorphy (Fig. 5, Clade A): primary spermathecae contiguous (character 38[0], several reversals within the genus).

Within *Tafana*, two reciprocally monophyletic species groups, including most species in the genus, were recovered: the *silhavyi* group and the *riveti* group.

Table 1. Statistics obtained in the maximum parsimony phylogenetic analysis of different parameters. Abbreviations: EW = equal weights; k = concavity constant; MPT = most parsimonious tree; CI = consistency index; RI = retention index.

Parameter of analysis	Number of MPTs	Number of steps	CI	RI	Total Fit
EW	1	106	0.47	0.61	23.135
$k=1$	4	111	0.45	0.57	17.651
$k=2$	2	108	0.46	0.60	21.160
$k=3$	2	108	0.46	0.60	23.335
$k=4$	2	108	0.46	0.60	24.800
$k=5$	1	108	0.46	0.60	25.863
$k=6$	1	108	0.46	0.60	26.673
$k=7$	1	107	0.46	0.60	27.319
$k=8$	1	107	0.46	0.60	27.844
$k=9$	1	107	0.46	0.60	28.279
$k=10$	1	107	0.46	0.60	28.645
$k \geq 15$	1	106	0.47	0.61	29.870–32.456

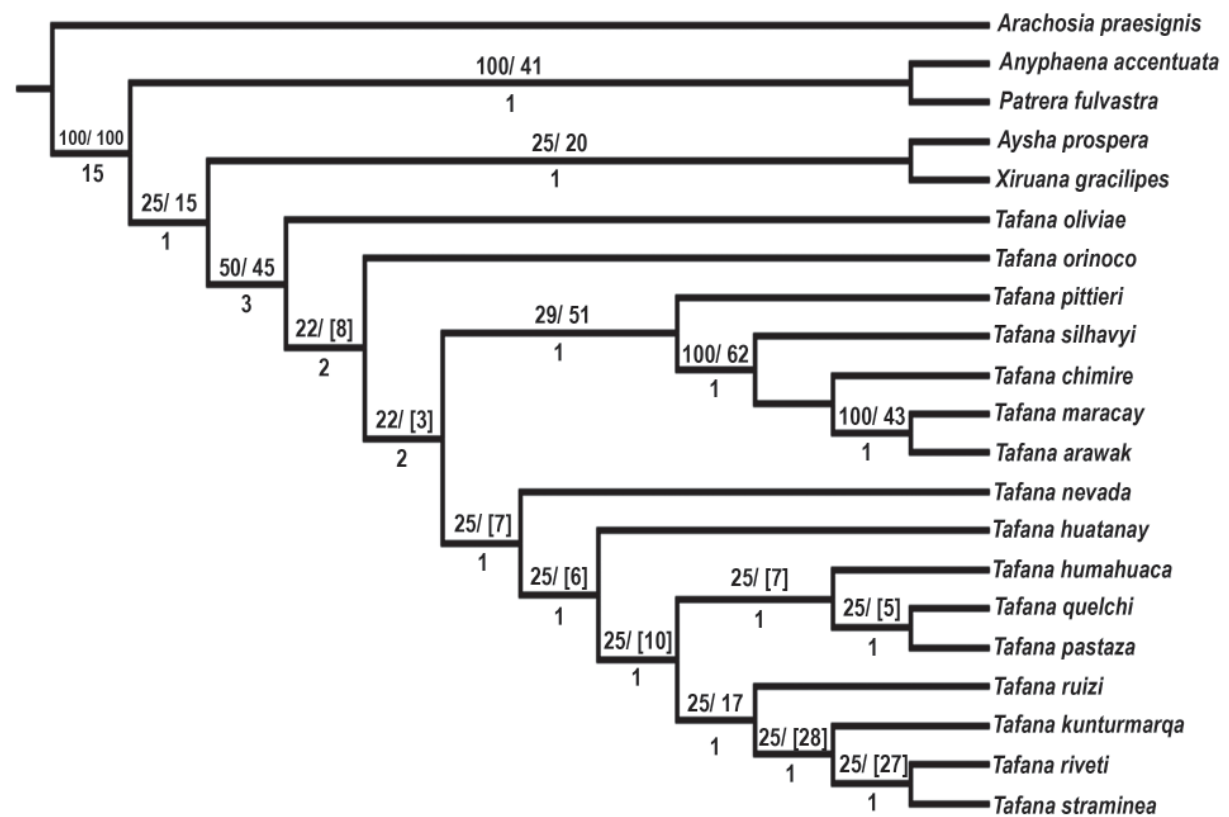


Fig. 1. The most parsimonious tree recovered under equal weights (106 steps, CI=0.47, RI=0.61). Numbers above branches are relative Goodman-Bremer support values (left) and Symmetric resampling values (right). Numbers below branches are Goodman-Bremer values.

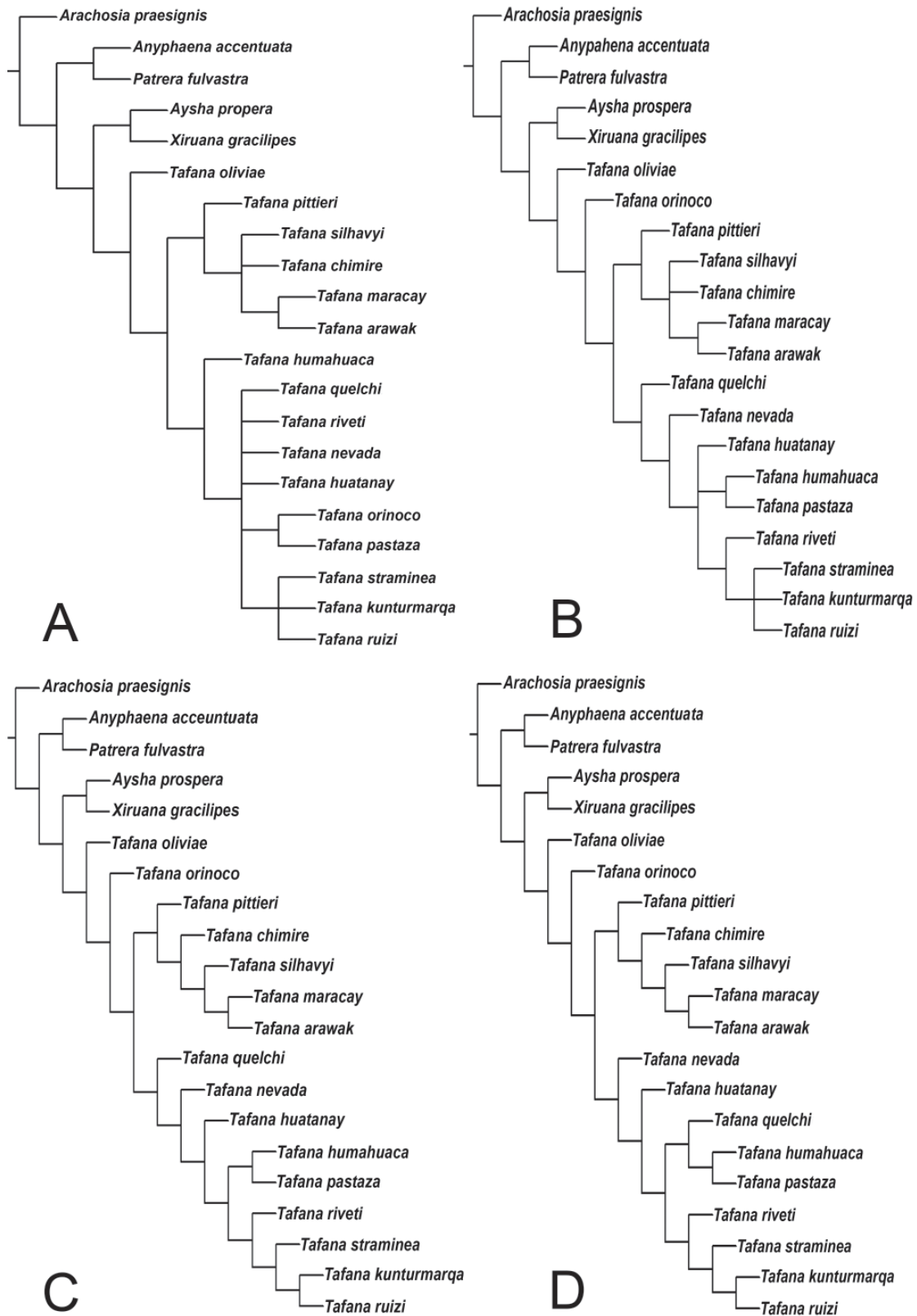


Fig. 2. Strict consensus of the most parsimonious trees obtained under implied weighting. **A.** Under $k=1$ (CI=0.45, R=0.57). **B.** $k=2-4$ (CI=0.46, RI=0.60). **C.** $k=5-10$ (CI=0.46, RI=0.60). **D.** Under $k=15-100$ (CI=0.47, IR=0.61).

Table 2. Non-homoplastic and homoplastic synapomorphies supporting the main relationships within the clades Anyphaeninae and *Tafana* (see Fig. 5).

Clade	Synapomorphies
Anyphaeninae <i>Ayscha</i> + <i>Xiruana</i> + <i>Tafana</i>	Chelicerae, paturon, number of promarginal teeth (Ch. 4): three → four Palp, tibiae, median tibial apophysis (Ch. 11): absent → present Bulb, tegulum, embolic process (Ch. 21): absent → present
<i>Tafana</i> [A]	Bulb embolus, apophysis at the base of the embolus (Ch. 23): absent → present Epigynum, anterior fold, posterior extension forming the lateral fold (Ch. 31): absent → present Epigynum, shape of lateral lobes (Ch. 32): straight → sinuous Epigynum, posterior region covered by cuticle (Ch. 36): absent → present Vulva, primary spermathecae contiguous (Ch. 38): contiguous, up to $\frac{1}{3}$ diameter → separate, $\frac{1}{2}$ to 1 diameter
<i>Tafana</i> [B]	Palp, cymbium, retrolateral projection (Ch. 8): absent → present Vulva, secondary spermathecae (Ch. 42): irregular → approximately rounded
<i>Tafana</i> [C]	Scopulae on anterior tibiae (Ch. 5): present → absent Palp, tibiae, median tibial apophysis (Ch. 11): present → absent Bulb, tegulum, ventral tegular process (Ch. 18): absent → present
<i>Tafana</i> [D]	Bulb, tegulum, ventral position, shape sperm duct (Ch. 15): U-shaped → inverted S-shaped Bulb, tegulum, ventral position, secondary horizontal loop of the SD (Ch. 16): absent → present Bulb, embolus, shape of apophysis at the base of the embolus (Ch. 25): conical → laminar Bulb, embolus, length of embolus (Ch. 27): short, up to half as long as embolus → long
<i>Tafana</i> [E]	Bulb, tegulum, basal protuberance of tegulum (Ch. 17): absent → present
<i>Tafana</i> [F]	Chelicerae, paturon, number of promarginal teeth (Ch. 4): four → five or more Vulva, primary spermathecae contiguous (Ch. 38): separate, $\frac{1}{2}$ the 1 diameter → contiguous, up to $\frac{1}{3}$ diameter
<i>Tafana</i> [G]	Bulb, tegulum, ventral tegular process, position (Ch. 19): apical margin of tegulum → near median apophysis Vulva, primary spermathecae contiguous (Ch. 38): separate, $\frac{1}{2}$ to 1 diameter → contiguous, up to $\frac{1}{3}$ diameter
<i>Tafana</i> [H]	Epigynum, atrial septum (Ch. 35): absent → present

The *silhavyi* group presents one exclusive synapomorphy (Figs 4–5, Clade D): the laminar shape of the apophysis at the base of the embolus (character 25[1]), and three homoplastic synapomorphies: tegulum, ventral position, sperm duct an inverted S-shape (character 15[2]); tegulum, ventral position, secondary horizontal loop of the sperm duct present (character 16[1]); and long length of the embolus (character 27[0]). This clade presents $RB < 50\%$ (Fig. 3). The *riveti* group presents one exclusive synapomorphy (Figs 4–5, Clade G): ventral tegular process, positioned near median apophysis (character 19[1]), and one homoplastic synapomorphy, primary spermathecae contiguous (character 38[1]), convergent in other clades. This clade presents $RB > 50\%$ (Fig. 3).

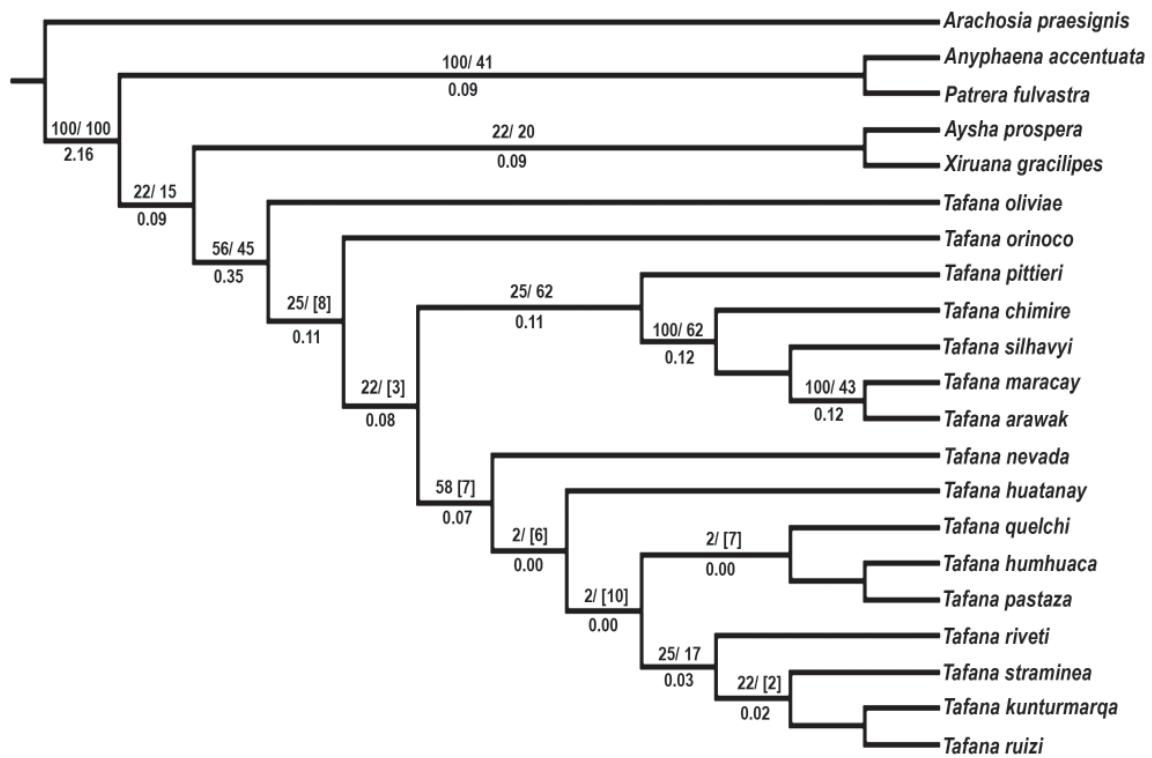


Fig. 3. Topology obtained under $k=7$ (CI=0.46, RI=0.60, Fit=27.319). Numbers above branches are relative Goodman-Bremer values (left) and Symmetric resampling values (right). Numbers below branches are Goodman-Bremer support values.

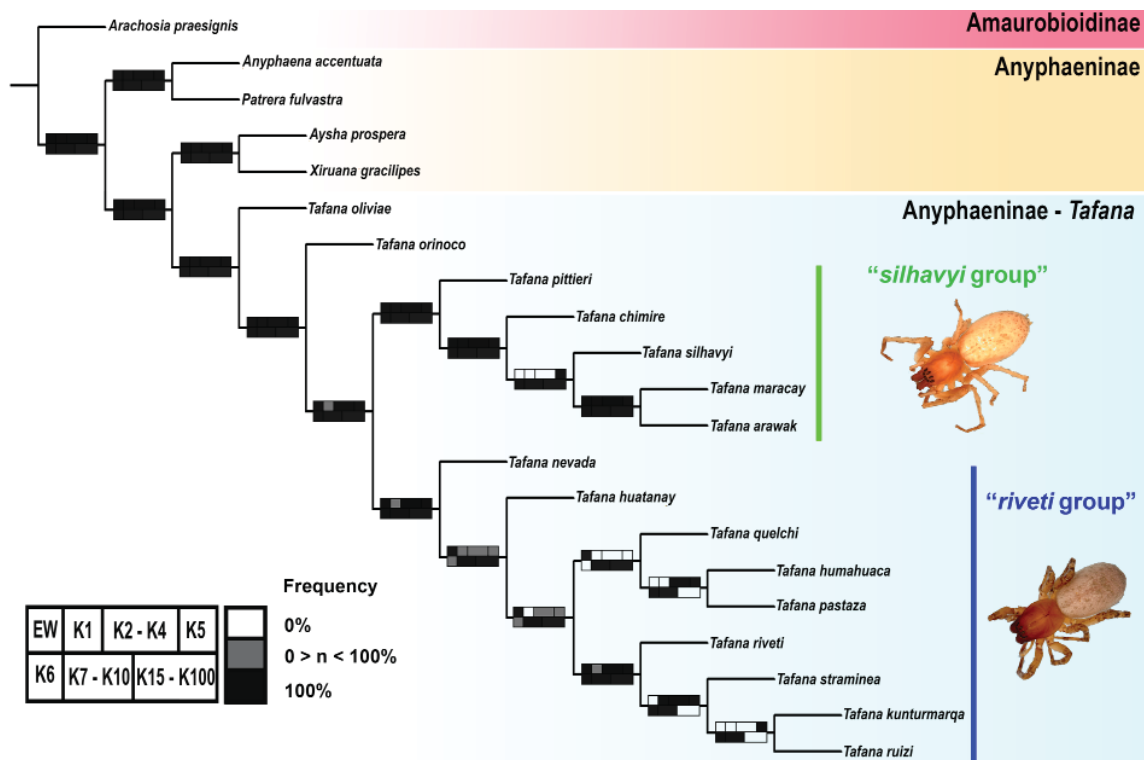


Fig. 4. Topology obtained under $k=7$ (Fit=27.319). The squares on the branches represent the sensitivity of the clade to different k values.

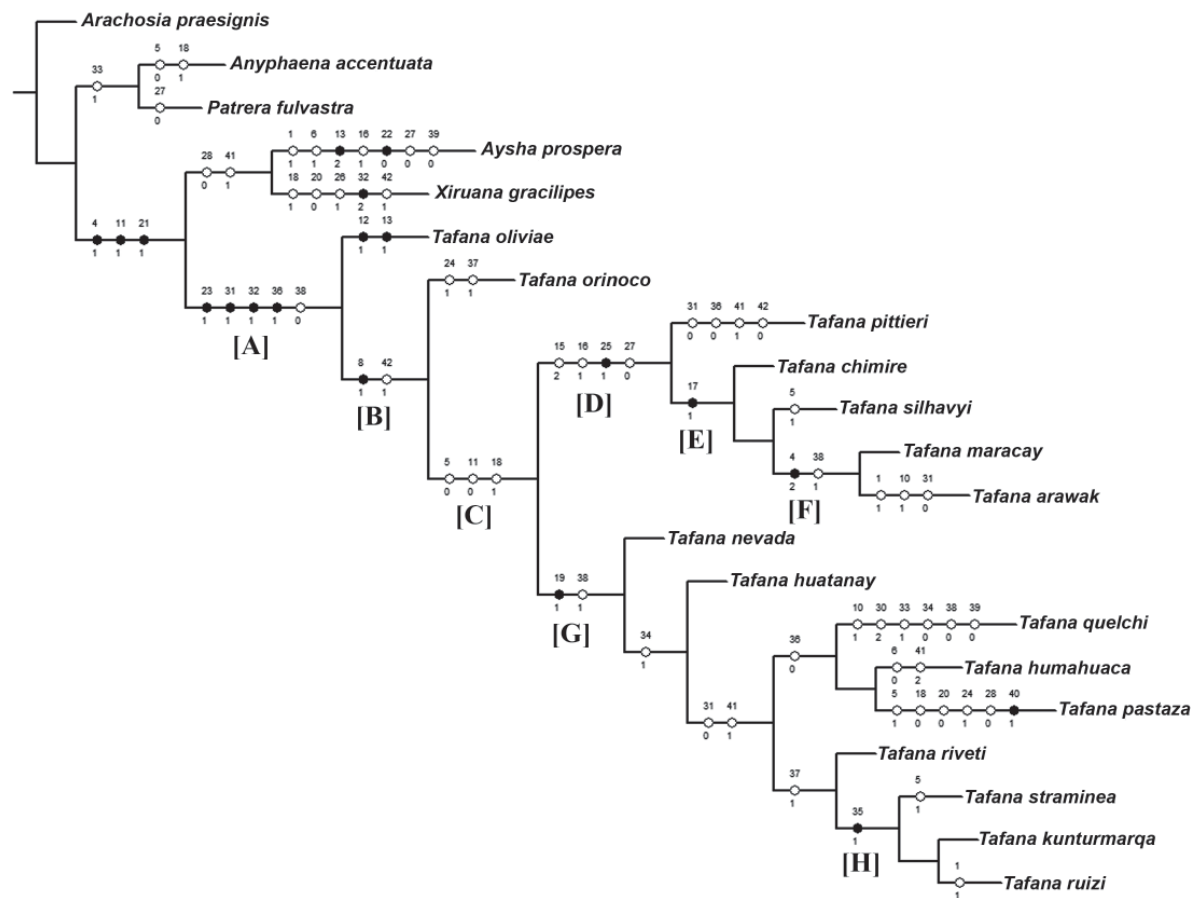


Fig. 5. Topology obtained under $k=7$. Black circles indicate non-homoplastic synapomorphies. White circles indicate homoplastic synapomorphies. The code number of each character is indicated above and its respective state below. Letters denote clade names as referred to in the text.

Taxonomy

Class Arachnida Cuvier, 1812
 Order Araneae Clerck, 1757
 Family Anyphaenidae Bertkau, 1878
 Subfamily Anyphaeninae Bertkau, 1878

 Genus *Tafana* Simon, 1903

Tafana Simon, 1903:124 (type species by original designation: *T. riveti* Simon, 1903: 124).

Tafana – Petrunkevitch 1911: 514; 1928: 174. — Roewer 1954: 546. — Bonnet 1959: 4232. — Brescovit 1997: 80, 90, figs 225–238.

Diagnosis

Males of species of the genus *Tafana* resemble those of the genera *Aljassa* Brescovit, 1997, *Aysha* Keyserling, 1891, *Hibana* Brescovit, 1991, *Hatitia* Brescovit, 1997, *Osoriella* Mello-Leitão, 1922, *Pippuhana* Brescovit, 1997, *Temnida* Simon, 1896, *Umuara* Brescovit, 1997 and *Xiruana* Brescovit, 1997 by having an embolic process in the internal male palp (see Brescovit 1997: 176–187, figs 221,

247, 265, 272, 280), an apophysis at the base of the embolus (see Oliveira & Brescovit 2015a: 209, fig. 5a–b) and further resemble *Umuara* by having a ventral tegular process near the median apophysis in the male palp (see Oliveira & Brescovit 2015b: 438, figs 2a–b), but differ by the presence of a conical or coiled laminar apophysis at the base of the embolus (Figs 9C–F, 12B, C, 23B, 26A–B). The females resemble those of *Anyphaena*, *Patrera* Simon, 1903, *Iguarima* Brescovit, 1997, *Umuara* and *Pippuhana* (see Brescovit 1997: 139–187), by having a hood on the anterior fold of the epigynum, but differ by having the posterior extension forming the lateral lobes (Figs 7D, 10F, 22F, 32E–F, 33D–E), lateral lobes sinuous (Figs 17F, 19F) and posterior region of the epigynum covered by cuticle (Figs 10F, 17F, 21F).

Description

Body from pale white to orange and reddish brown (Figs 10A, 11A, 22A). Legs orange or pale and darker at tarsi (Figs 22B, 25A). Carapace sub-rectangular, narrow in anterior region, and enlarged near coxae I–III, cephalic region high, highest behind the posterior eye row (Figs 8A, 10A). Eyes, in dorsal view, anterior row slightly recurved and posterior row procurved (Figs 8A, 10B). Chelicerae robust and projected, with vertical length approximately half the length of the carapace, basal condyle conspicuous (Fig. 11A–B), with 3–5 promarginal teeth and 4–7 retromarginal (Fig. 8B). Two rows of trichobothria with striated base in dorsal view on the metatarsus and tarsus I–IV (Fig. 8J). Tarsal organ with teardrop shape on the distal region of tarsus and male palp (Figs 8I, 20D), slit sensilla elongated on the tarsus (Fig. 8K). Paired tarsal claws with 8–14 teeth (Fig. 8G–H). Male palp: patellar apophysis short and rounded (Figs 10D, 16D–E, 24D); distal prolateral tibial apophysis short (Fig. 13C, E); retrolateral tibial apophysis with large base and conical apex (Fig. 22D–E), usually exhibiting anterior branches and posterior branches (Fig. 13C–D) or only one branch (Figs 10D, 11D, 24D–E); median tibial apophysis branched (Fig. 29D–E) or unique (Fig. 30D–E); cymbium oval with retrolateral projection (Figs 9A–B, 10C, 12A, 22C, 26A, C), with small furrow under this projection, to accommodate the retrolateral tibial apophysis, or without (Figs 29C, 30C); chemosensory setae on the cymbium (Fig. 20D); subtriangular and ypsiloid petiole (Fig. 9C–D, F); subtegulum with 5–6 semicircular rings, short and exposed distal projection on the prolateral side on the palp when not expanded (Fig. 9D–E); tegulum with ventral tegular process narrow near the median apophysis (Figs 9B, 10C, 12B–C, 18B) and bordering the apex of the tegulum (Figs 9A, 22C, 26A–B, 28C); sclerotized median apophysis long, sharp and with a curved apex (Figs 18B, 20B, 23C); embolic process conical, sclerotized, covered by the tegulum, inserted at the base of the embolus (Fig. 9C–F); sperm duct presenting four or five loops in palp expanded (Fig. 9C–F) and in palp not expanded three loops in ventral view (Fig. 9A–B), internally traversing the embolic process reaching the embolus (Fig. 9E); embolus long (Figs 9D, 22C, 24C) or short (Figs 10C, 15C, 17C), filiform helical and curved retro-apically, connected to the embolic process (Figs 9D–E, 15C, 22C); apophysis at the base of the embolus, conical (Figs 9B, E, 10C, 12C, 18A–B) or laminar (Figs 23B, 24C, 26A–B). Oval abdomen, tracheal spiracle curved in the middle of the abdomen in ventral view (Figs 7B, 8L); anterior spinnerets bisegmented, with basal article large and distal article circular, with several spigots of piriform gland and one spigot of the ampullate gland (Fig. 8C–D); median spinnerets unsegmented, with several spigots of the aciniform gland and not presenting spigots of the cylindrical gland (Fig. 8C, E); posterior spinnerets bisegmented with basal and distal article cylindrical, one third longer than the others, with several spigots of the aciniform gland and one spigot of the ampullate gland without spigots of the cylindrical gland (Fig. 8C, F); colulus substituted by 8–10 setae (Fig. 8C). Epigynum with sinuous lateral lobes, lobe parallel in the posterior region (Figs 10F, 22F); hood approximately triangular (Figs 10F, 16F, 25F, 27F), semicircular (Figs 11F, 14F, 32D) or circular (Figs 15F, 17F, 30F, 32J, 33G–H) in the anterior region; posterior region with cuticle covered the lateral lobes (Figs 10F, 11F, 17F, 21F, 27F) or without (Figs 13F, 15F, 16F, 28F); atrium with septum in the anterior region (Figs 11F, 14F, 21F) or without (Figs 13F, 15F, 22F, 25F); copulatory ducts sinuous (Figs 10G, 11G, 19G, 32F–I) or coiled (Figs 13G, 16G, 32H, K), running along margin of the lateral lobes, reaching the spermathecae, visible through transparency; secondary spermathecae rounded (Figs 10G, 11G, 14G, 32F–G, I, 33B–C) but may be irregular or inconspicuous (Figs 13G, 28G, 29G, 32H, 33F–G); secondary spermathecae short,

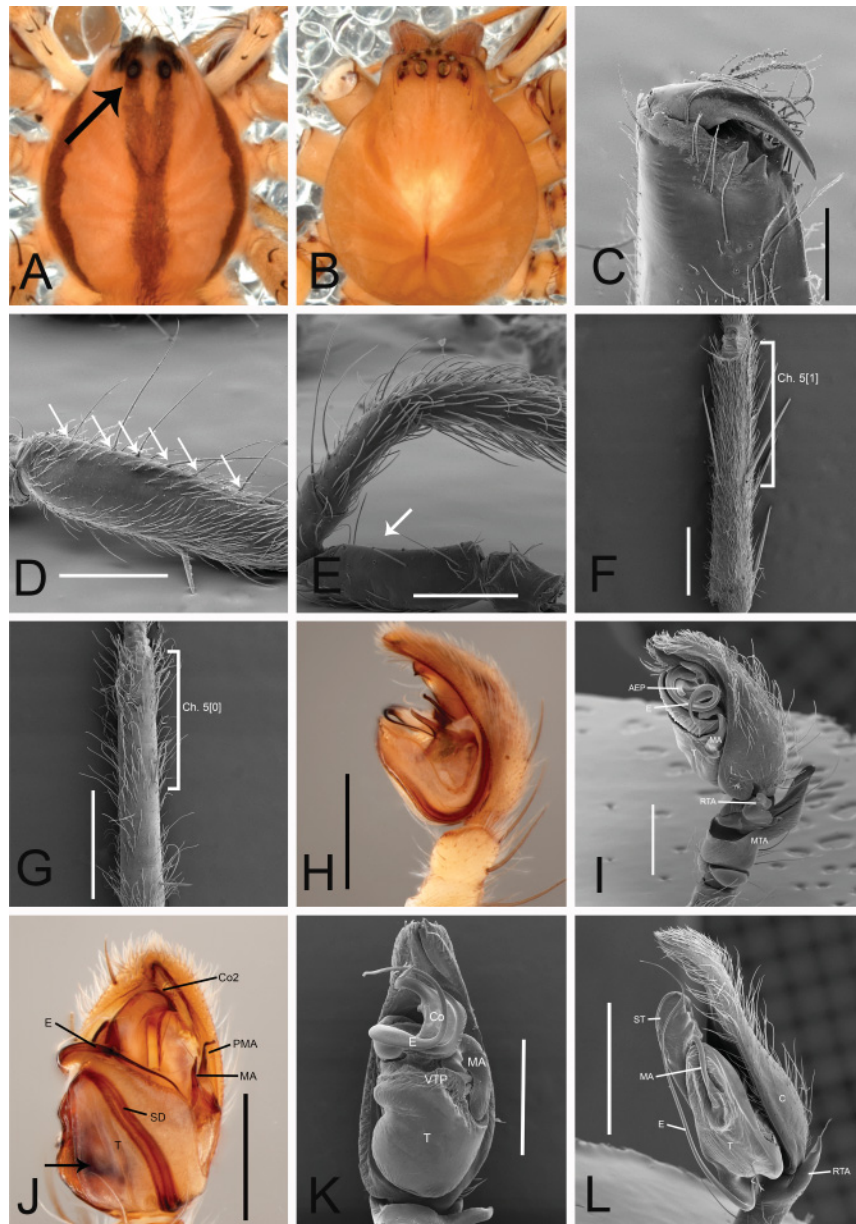


Fig. 6. **A.** *Arachosia praesignis* (Keyserling, 1891), ♂, cephalothorax, dorsal view (arrow shows row of the eyes) (IBSP 87975). **B.** *Patrera fulvastra* Simon, 1903, ♂, cephalothorax, dorsal view (MCN 24207). **C.** *Arachosia praesignis*, ♂, chelicera, ventral view (IBSP 87975). **D.** *Aysha prospera* Keyserling, 1891, ♀, palp femur, prolateral view (arrows show setal row) (IBSP 19780). **E.** *Tafana silhavyi* (Caporiacco, 1955), ♀, prolateral view (arrow indicating the absence of setae) (MNHN 11312). **F.** *Arachosia praesignis*, ♂, leg I, tibia, ventral view, scopulae (IBSP 87975). **G.** *Tafana riveti* Simon, 1903, ♂, leg I, tibia, ventral view, scopulae (MCZ). **H.** *Arachosia praesignis*, ♂, palp, retrolateral view (IBSP 87975). **I.** *Aysha prospera*, ♂, palp, retrolateral view (IBSP 38914). **J.** *Arachosia praesignis*, ♂, palp, ventral view (arrow shows the basal notch on the tegulum) (IBSP 87975). **K.** *Xiruana gracilipes* (Keyserling, 1891), ♂, palp, ventral view (IBSP 72660). **L.** *Patrera fulvastra*, ♂, palp, retrolateral view (MCN 24207). Abbreviations: AEP=apophysis of embolic process; C=cymbium; Co=conductor; Co2=secondary conductor; E=embolus; MA=median apophysis; MTA=median tibial apophysis; PMA=paramedian apophysis; RTA=retrolateral tibial apophysis; SD=sperm duct; ST=subtegulum; T=tegulum; VTP=ventral tegular process. Scale bars: C=0.2 mm; D, K=0.4 mm; E=0.3 mm; F, H–J=0.5 mm; G, L=1 mm.

near the primary spermathecae (Figs 15G, 17G, 22G, 26D, 32F, J, L), wide (Figs 11G, 13G, 14G, 32G, I) or in the middle of the copulatory ducts (Figs 16G, 21G, 29G, 32K, 33G); primary spermathecae oval, positioned together (Figs 10G, 15G, 20E, 22G, 26D, 32F–G) or separated from each other by almost a third of their diameter (Figs 13G, 28G, 29G, 33F–H); fertilization ducts near the epigastric furrow, originating from base of spermathecae (Figs 10G, 11G, 20E, 22G, 26D, 29G, 32F–L, 33A–H).

The *riveti* group

Diagnosis

Males of this group resemble those of the *silhavyi* group by the apophysis at the base of the embolus, but differ by presenting an apophysis at the base of the embolus that is short and conical (Fig. 12B–C); the sperm ducts are ‘U-shaped’ in the male palp when it is not expanded (Figs 9B, 10C). The females can be recognized by the short atrium, presenting a septum or not, and copulatory ducts narrow (Figs 10F–G, 11F, 15F–G).

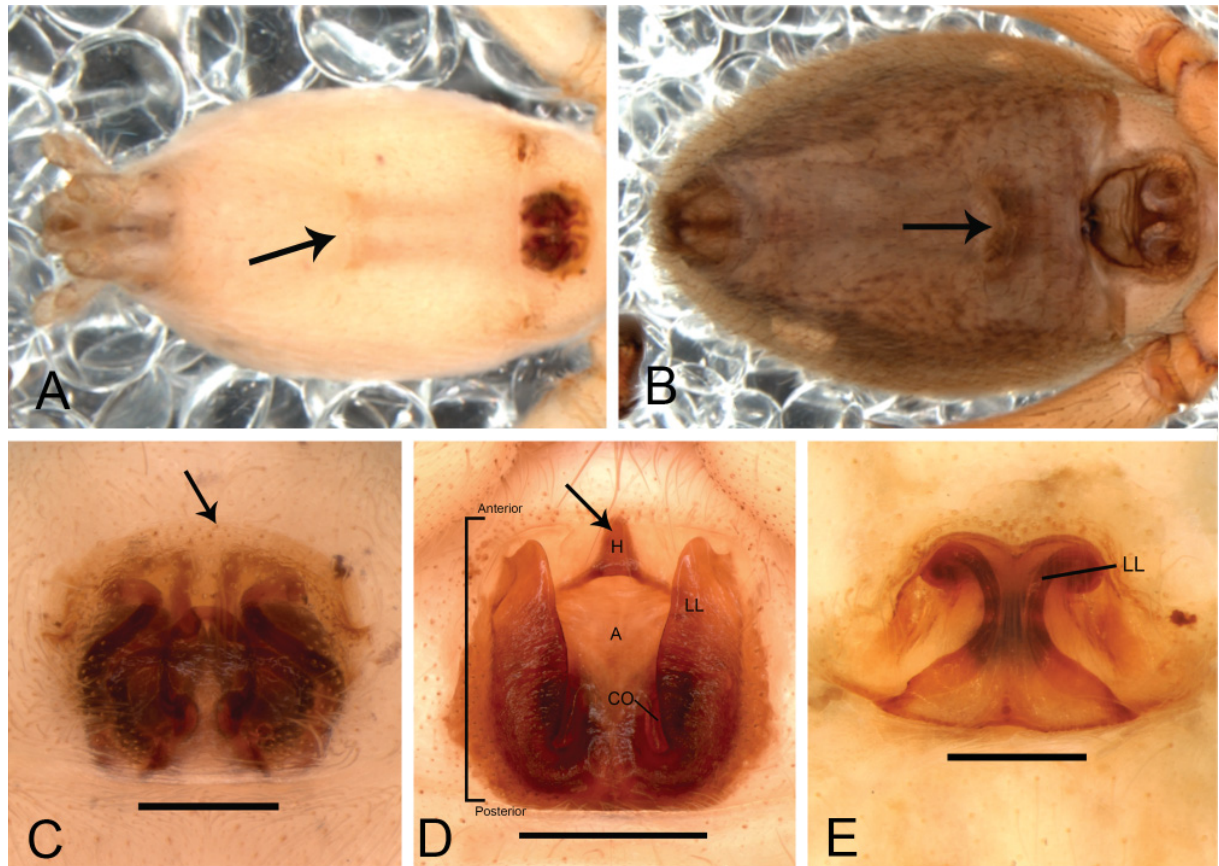


Fig. 7. A. *Arachosia praesignis* (Keyserling, 1891), ♀, abdomen, ventral view (arrow indicating position of tracheal spiracle) (IBSP 87975). B. *Aysha prospera* Keyserling, 1891, ♀, abdomen, ventral view (arrow indicating position of tracheal spiracle) (IBSP 19783). C. *Arachosia praesignis*, epigynal plate, dorsal view (arrow indicates the absence of a hood) (IBSP 87975). D. *Patrera fulvastra* Simon, 1903, epigynal plate, dorsal view, (arrow indicates the hood) (MCN 24208). E. *Xiruana gracilipes* (Keyserling, 1891), epigynal plate, dorsal view (IBSP 166120). Abbreviations: A=atrium; CO=copulatory opening; H=hood; LL=lateral lobes. Scale bars: D=0.6 mm; C, E=0.25 mm.

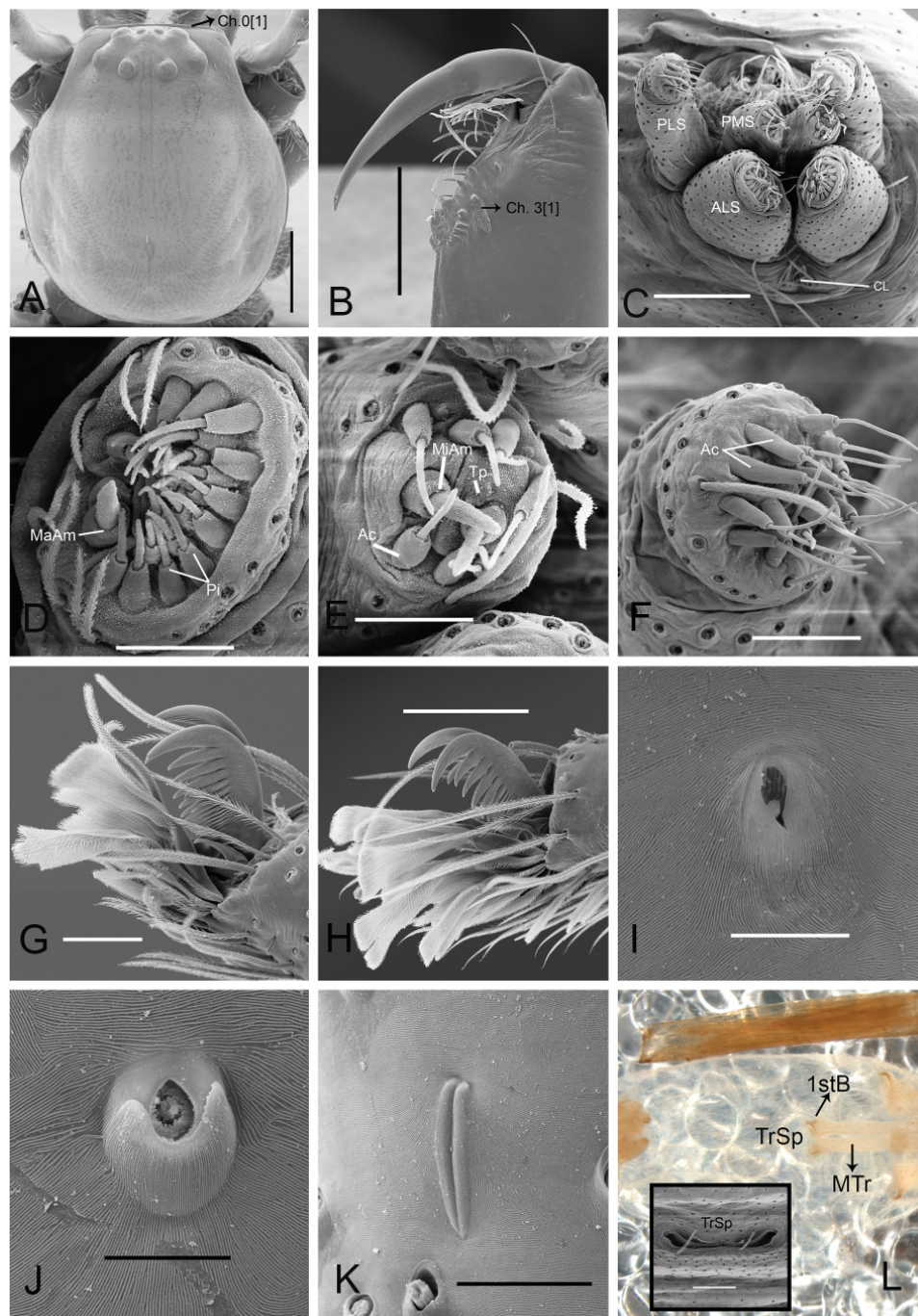


Fig. 8. A–B, G–K. *Tafana silhavyi* (Caporiacco, 1955), ♂ (MNHN 11312). A. Cephalothorax, dorsal view. B. Chelicera, ventral view. G. Claws, tarsus I, prolateral view. H. Claws, tarsus IV, prolateral view. I. Tarsal organ, dorsal view. J. Tricothorium, dorsal view. K. Slit sensilla, dorsal view. – C–F. *Tafana maracay* sp. nov. (MNHN 11314), ♀. C. Spinnerets, frontal view. D. Anterior lateral spinneret. E. Posterior median spinneret. F. Posterior lateral spinneret. – L. *Tafana pastaza* sp. nov. (AMNH), ♂, abdomen, tracheal system, ventral view. Abbreviations: Ac=aciniform gland spigot; ALS=anterior lateral spinnerets; CL=colulus; Ch=character; MaAm=major ampullate gland spigot; MiAm=minor ampullate gland spigot; MTr=median tracheae; PLS=posterior lateral spinnerets; PMS=posterior median spinnerets; Pi=piriform gland spigot; Tp=tartipore; TrSp=tracheal spiracle; 1stB=first bifurcation of median trachea. Scale bars: A=0.5 mm; B=0.3 mm; C=0.2 mm; D–E=0.04 mm; F–G=0.05 mm; H–J=0.01 mm; K=0.02 mm.

Included species

Tafana riveti Simon 1903, *T. straminea* (L. Koch 1866), *T. quelchi* (Pocock 1895), *T. kunturmarqa* sp. nov., *T. humahuaca* sp. nov., *T. pastaza* sp. nov., *T. nevada* sp. nov., *T. huatanay* sp. nov. and *T. ruizi* sp. nov.

Tafana riveti Simon, 1903
Figs 6G, 9B, E–F, 10, 32F, 34

Tafana riveti Simon, 1903: 124.

Tafana riveti – Berland 1913: 105, figs 91–96 (descr. of male). — Roewer 1954: 546. — Bonnet 1959: 4232. — Brescovit 1997: 90, figs 225–238.

Diagnosis

Males of *Tafana riveti* resemble those of *T. straminea*, *T. kunturmarqa* sp. nov., *T. humahuaca* sp. nov. and *T. nevada* sp. nov., by the apophysis at the base of the embolus short, but differ by retrolateral tibial apophysis short and with large base in retrolateral view and visible subtegulum on palp when not expanded (Fig. 10C–E). Females differ from those of other species by the short atrium, triangular hood and lateral lobe curved in the anterior region and sclerotized (Fig. 10F).

Material examined

Holotype

ECUADOR • ♀; Cerro Troya, 5 km S of Tulcan; [0.73333° N, 77.68333° W]; 1901; G. Riveti leg.; MNHN.

Other material

COLOMBIA – **Valle del Cauca** • 1 ♂, Lago Calima; [3°53'44" N, 76°29'41" W]; Jan. 1979; W. Eberhard leg.; MCZ. – **Magdalena** • 1 ♂; Sierra Nevada de Santa Marta; [10°53'27.3" N, 73°59'43.9" W]; 28 Sep. 2017; L. Martínez leg.; IBSP 223307.

ECUADOR – **Quito** • 1 ♀; Pichincha, Monte Pichincha; [0°15'00" S, 78°35'00" W]; Oct. 1944; G.W. Prescott leg.; MCZ • 1 ♂, 1 ♀; Pichincha; 15 km from Pifo; [0°15'00" S, 78°35'00" W]; 5 Oct. 1982; A. Roig leg.; MACN-Ar • 3 ♂♂, 4 ♀♀; same collection data as for preceding; MCN 24624 • 2 ♀♀; Pichincha, 10 km from Pifo; [0°15'00" S, 78°35'00" W]; 30 Sep. 1978; A. Roig leg.; MACN-Ar • 1 ♂; Pichincha, *Eucalyptus* forest; [0°15'00" S, 78°35'00" W]; 30 Sep. 1978; A. Roig leg.; MACN-Ar • 1 ♂; Cotopaxi; [0°40' S, 78°26' W]; 18 Apr. 1982; A. Roig leg.; MACN-Ar • 1 ♀; Loja [3°59' S, 79°12' W]; 21–22 Aug. 1977; L.E. Peña leg.; AMNH • 1 ♀; Azuay; [2°53'57" S, 79°00'55" W]; 20 Aug. 1988; W. Maddison leg.; MCZ • 1 ♂; Chimborazo; [2°8'59" S, 78°54'27" W]; Danas; 1904; G. Riveti leg.; MNHN • 2 ♂♂; Casitagua; [3°20'00" S, 78°29'00" W]; 1903; G. Riveti leg.; MNHN.

PERU – **Cuzco** • 1 ♂; Machu Picchu; [13°9'47" S, 72°32'44" W]; 19–23 Jun. 1964; B. Malkin leg.; AMNH.

Remark

The type locality of Cerro Troya, 5 km south of Tulcan was defined using a database of Wharton Lab, Department of Entomology, Texas A&M University from http://mx.speciesfile.org/projects/8/public/public_content/show/21273?content_template_id=88.

Description

Male and female described by Brescovit (1997: 90, figs 225–238).

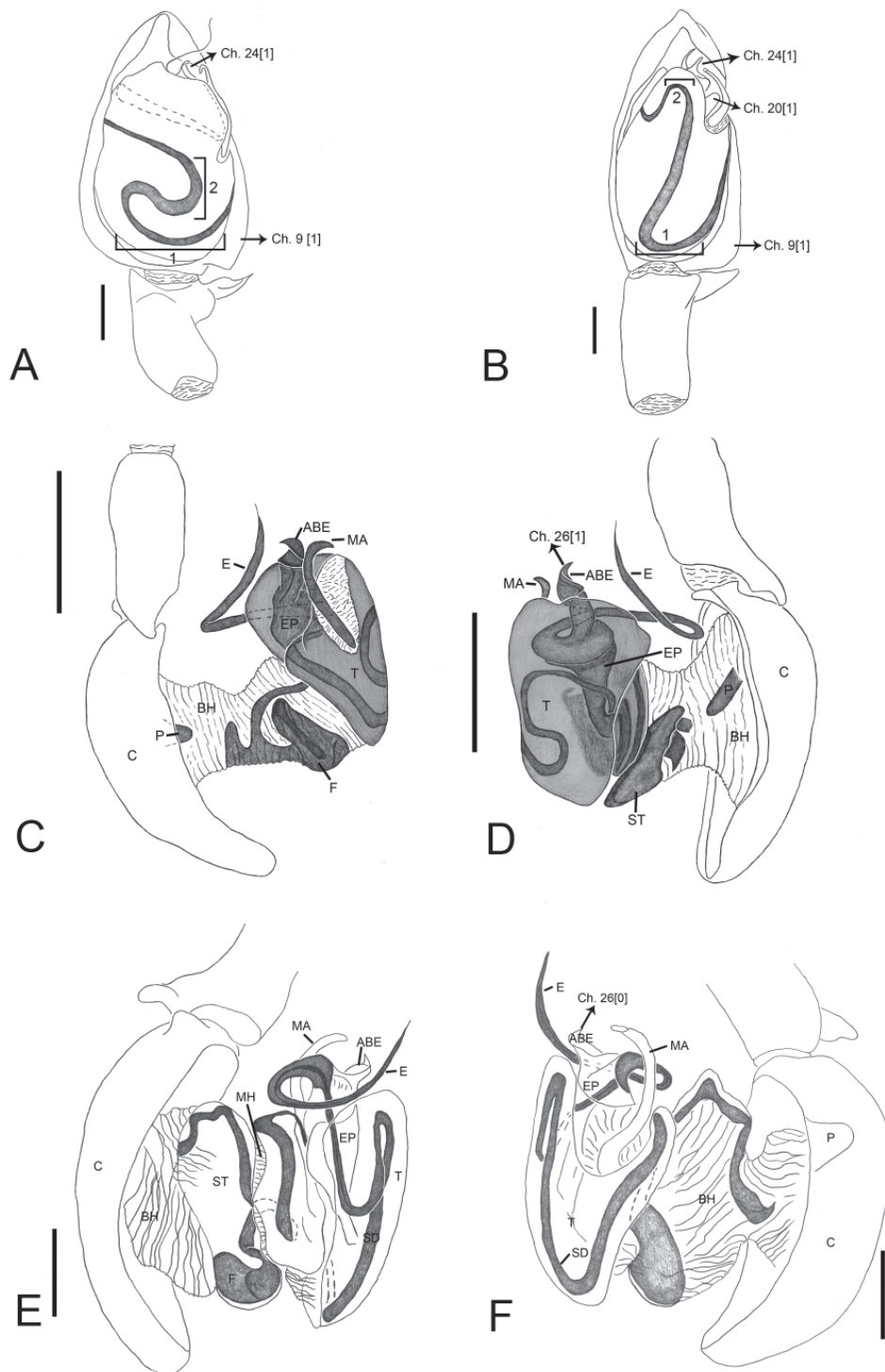


Fig. 9. A, C–D. *Tafana silhavyi* (Caporiacco, 1955), ♂ (MNHN 11312). A. Left palp unexpanded, ventral view (arrow indicating character). C. Left palp expanded, prolateral view. D. Left palp expanded, retrolateral view (arrow indicating character). B. *Tafana riveti* (MCZ), ♂, left palp. E–F. *Tafana riveti* (MCZ), ♂. E. Left palp, retrolateral view. F. Left palp, prolateral view (arrow indicating character). Abbreviations: 1=primary loop of the sperm duct; 2=secondary loop of the sperm duct; ABE=apophysis of base of the embolus; BH=basal haematodocha; C=cymbium; Ch=character; E=embolus; EP=embolic process; F=fundus; MA=median apophysis; MH=median haematodocha; P=petiole; SD=sperm duct; ST=subtegulum; T=tegulum. Scale bars: A–B, E–F=0.25 mm; C–D=0.5 mm.

Distribution

Colombia, Peru and Ecuador (Fig. 34).

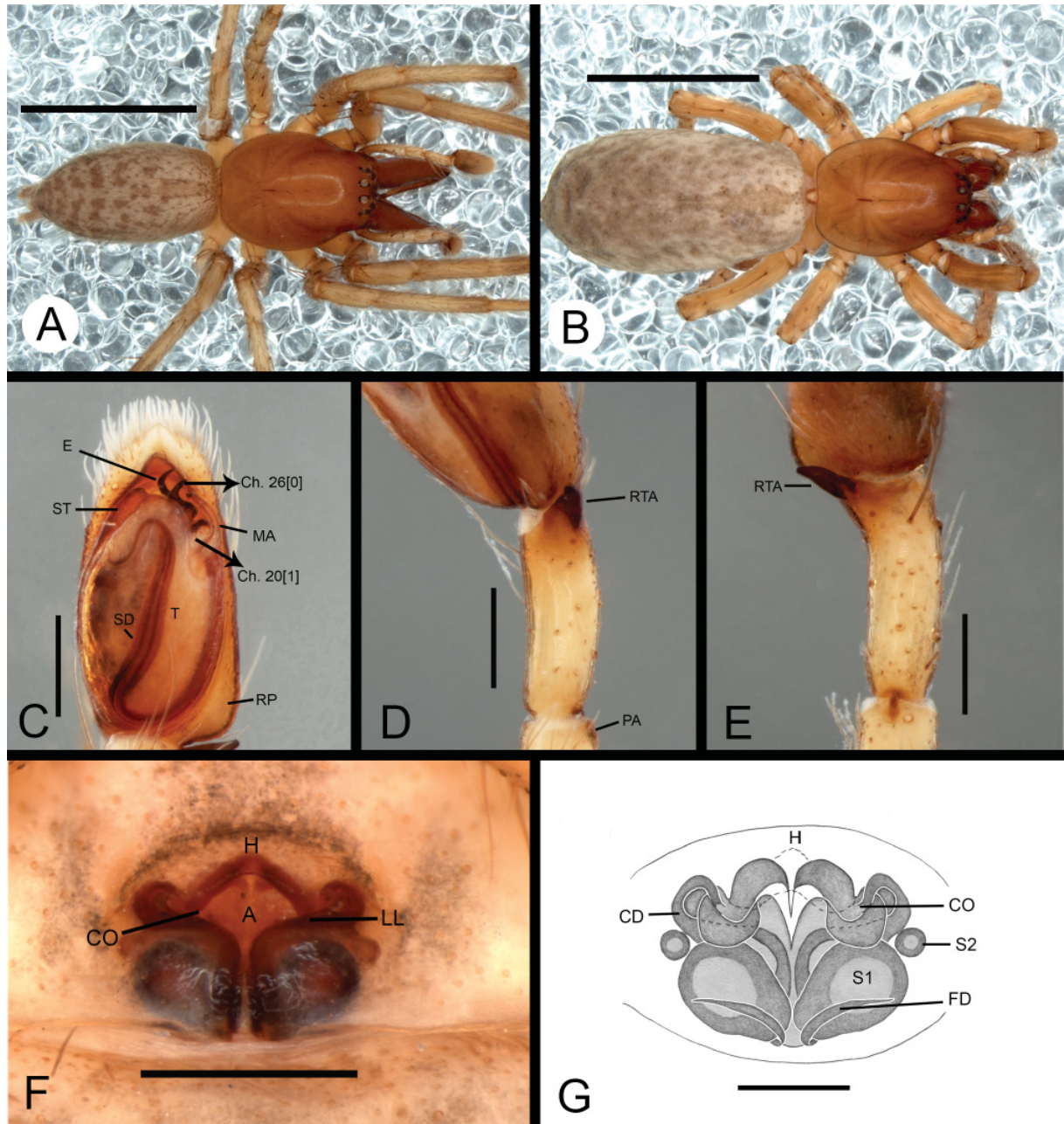


Fig. 10. *Tafana riveti* Simon, 1903 (A, C–E=♂, MCZ; B, F–G=♀, MCZ). **A.** Habitus, dorsal view. **B.** Habitus, dorsal view. **C.** Left palp, ventral view (arrow indicating character). **D.** Left palp, retrolateral view. **E.** Left palp, dorsal view. **F.** Epigynum, ventral view. **G.** Vulva, dorsal view. Abbreviations: A=atrium; Ch=character; CD=copulatory ducts; CO=copulatory opening; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; MA=median apophysis; PA=patellar apophysis; RP=retrolateral projection; RTA=retrolateral tibial apophysis; SD=sperm duct; ST= subtegulum; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum. Scale bars: A–B=3.5 mm, C–E, G=0.25 mm, F=0.4 mm.

***Tafana straminea* (L. Koch, 1866)**

Figs 11–12, 32G, 34

Anyphaena straminea L. Koch, 1866: 207 (type: immature holotype from Santa Fé de Bogota, currently Bogotá, Colombia, deposited in BMNH, examined).

Tafana straminea – Brescovit 1997: 90.

Diagnosis

Males of *Tafana straminea* differ from those of other species by the long embolus and the secondary looping of sperm duct not reaching the border of the tegulum (Figs 11C, 12A–C). Females resemble those of *T. kunturmarqa* sp. nov. and *T. ruizi* sp. nov. by the epigynal plate shape with an atrial septum, but differ by the wide atrial septum and long fertilization ducts, ventrally overlapping the primary spermathecae (Figs 11F–G, 32G).

Material examined

Holotype

COLOMBIA • immature; Santa Fé de Bogota [currently Bogotá]; [4°35'53" N; 74°4'33" W]; 1 Jul. 1890; BMNH 1890.7.1.583.

Other material

COLOMBIA – **Boyacá** • 1 ♂; Tunja, Páramo Alto Belén; [5°59'22" N, 72°54'44" W]; 23 Sep. 1985; H. Sturn leg.; MCZ. – **Cundinamarca** • 1 ♂; Monte Redondo, La Calera, National Park Chingaza; [4°28'00" N, 73°44'00" W]; 14 Sep. 1986; C. Valderrama leg.; IBSP 258178 • 1 ♂; same collection data as for preceding; IBSP 258180 • 1 ♀; same collection data as for preceding; IBSP 258181.

ECUADOR – **Tungurahua** • 1 ♂; Baños; [1°23'47" N, 78°25'29" W]; 2 May 1939; Clarke and Macintyre leg.; AMNH • 2 ♀♀; same collection data as for preceding; AMNH • 1 ♂; Apr. 1939; AMNH.

Remark

The holotype is an immature in last instar. In comparison with other adult specimens from Colombia, we noticed that the reddish brown color of the carapace is unique for this species. The spots on the abdomen and spination of the legs are similar. Therefore, we consider here that these specimens represent the adults of the species *Tafana straminea*.

Description

Male (MCZ)

COLOR. Carapace reddish brown, darker in cephalic region (Fig. 11A), labium, endites, sternum and chelicerae reddish brown. Legs I–IV yellow, darker at tarsi. Abdomen grayish with dorsal spots (Fig 11A).

MEASUREMENTS. Total length 10.01, carapace length 4.3, width 3.4. Clypeus height 0.1. Eye diameters and interdistances: AME 0.2, ALE 0.18, PME 0.12, PLE 0.12; AME–AME 0.08, AME–ALE 0.08, PME–PME 0.2, PME–PLE 0.2, ALE–PLE 0.02. Chelicerae 2.7 long, with four promarginal teeth and five retromarginal denticles.

LEG MEASUREMENTS. I—femur 3.9/patella 1.7/tibia 4.0/metatarsus 3.3/tarsus 1.4/total 14.3; II—3.6/1.8/3.6/3.0/1.3/13.3; III—2.1/1.0/1.43/1.6/0.7/6.83; IV—3.4/1.5/3.4/3.6/1.1/13.0.

LEG SPINATION. I—tibia v1-1-1, metatarsus v2-0-0; II—tibia v0-1-1; III—tibia p0-0-1, r0-0-1, metatarsus v2-1-2, p0-1-1; IV—tibia p0-0-0, metatarsus p0-1-1, r0-1-1.

PALP. Retrolateral tibial apophysis in vertical position long and conical; cymbium with prolateral projection; ventral tegular process short near of the base of the median apophysis; apophysis at the base of the embolus short; sperm duct in vertical position with secondary looping without reaching the apex of the tegulum; median apophysis sharp and curved at the apex (Figs 11C–E, 12A–C).

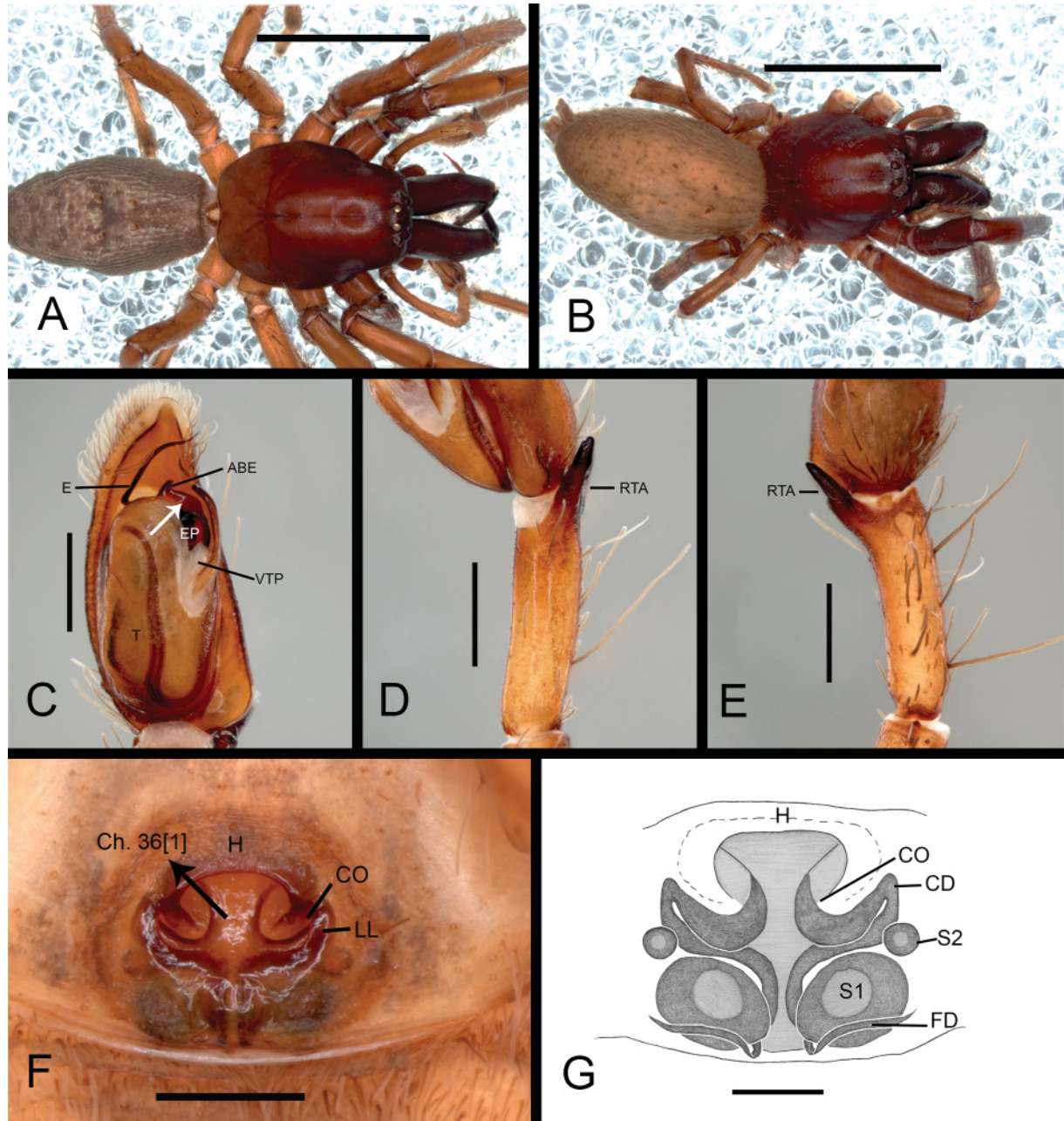


Fig. 11. *Tafana straminea* (L. Koch, 1866) (A, C–E=♂, MCZ; B, F–G=♀, IBSP 258181). **A.** Habitus, dorsal view. **B.** Habitus, dorsal view. **C.** Left palp, ventral view (arrow indicating the base of the embolus). **D.** Left palp, retrolateral view. **E.** Left palp, dorsal view. **F.** Epigynum, ventral view (arrow indicating character). **G.** Vulva, dorsal view. Abbreviations: ABE=apophysis of base of the embolus; CD=copulatory ducts; CO=copulatory opening; E=embolus; EP=embolic process; FD=fertilization ducts; H=hood; LL=lateral lobes; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum; VTP=ventral tegular process. Scale bars: A–B=3.5 mm; C–G=0.25 mm.

ABDOMEN. Length 5.7, epigastric furrow 1.3 from tracheal spiracle, spiracle 2.5 from base of spinnerets.

Female (IBSP 258181)

COLOR. As in males of this species (Fig. 11B).

MEASUREMENTS. Total length 12.0, carapace length 5.8, width 4.3. Clypeus height 0.22. Eye diameters and interdistances: AME 1.0, ALE 1.0, PME 1.1, PLE 0.9; AME–AME 0.9, AME–ALE 0.5, PME–PME 1.5, PME–PLE 1.8, ALE–PLE 0.7. Chelicerae 2.8 long, with three promarginal teeth and four retromarginal denticles.

LEG MEASUREMENTS. I—femur 5.23/patella 2.6/tibia 5.2/metatarsus 4.4/tarsus 1.9/total 19.33; II—4.8/2.4/4.5/3.9/1.7/17.3; III—3.7/1.73/2.7/3.1/1.2/12.43; IV—3.7/1.1/3.3/3.7/1.1/12.9.

LEG SPINATION. I—tibia v0-1-0, metatarsus 2-0-0; II—tibia v0-1-0; III—tibia p1-1-0, r1-1-0, metatarsus v2-1-2; IV—tibia r1-1-0.

ABDOMEN. Length 6.1, epigastric furrow 1.1 from tracheal spiracle, spiracle 2.7 from base of spinnerets.

EPIGYNUM. Hood circular and sclerotized; epigynal plate with posterior region covered by cuticle; atrium with septum; lateral lobes extremely curved in the anterior region. Internally, copulatory ducts large in the anterior region; secondary spermathecae rounded in middle of the copulatory ducts, oval primary spermathecae; fertilization ducts long (Figs 11F–G, 32G).

Variation

Four males: total length 7.4–11.5; carapace 3.3–4.8; femur I 3.0–5.4. Two females: total length 7.8–8.4; carapace 3.4–3.5; femur I 2.8–3.0.

Distribution

Colombia and Ecuador (Fig. 34).

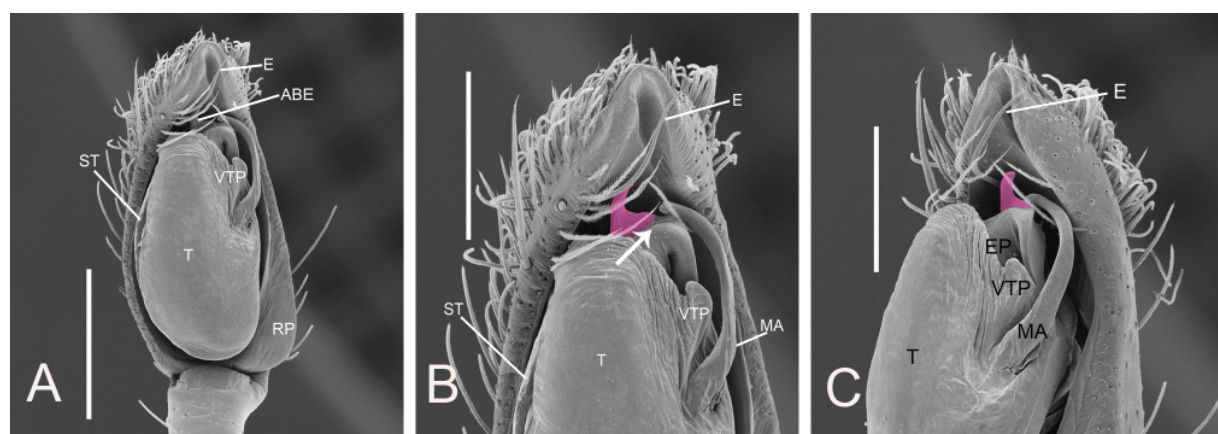


Fig. 12. *Tafana straminea* (L. Koch, 1866), ♂ (MCZ). **A.** Left palp, ventral view. **B.** Left palp, ventral view (arrow indicating the base of the embolus). **C.** Left palp, retrolateral view. Abbreviations: ABE=apophysis of base of the embolus; E=embolus; EP=embolic process; MA=median apophysis; RP=retrolateral projection; ST=subtegulum; T=tegulum; VTP=ventral tegular process. Scale bars: A, C=0.5 mm; B=0.3 mm.

***Tafana quelchi* (Pocock, 1895)**

Figs 13, 32H, 34

Ayscha quelchii Pocock, 1895: 140–143, fig. 1 (syntypes: adult male and immature male from Monte Roraima [frontier between Brazil and Venezuela], deposited in BMNH, examined).

Anypaena quelchii – Pocock 1900: 67, figs 2c–d. — Bonnet 1955: 347.

Tafana quelchii – Brescovit 1997: 89 (designation of lectotype and paralectotype).

Diagnosis

Males of *Tafana quelchi* differ from those of all other species in the genus by the presence of a bifid retrolateral tibial apophysis and by the apical prolateral tibial apophysis (Fig. 13C–E). Females are readily recognized by having the copulatory ducts coiled, covering the primary spermathecae (Figs 13G, 32H).

Material examined

Syntypes

BRAZIL • 1 ♂, 1 immature ♂; Monte Roraima [frontier between Brazil and Venezuela]; J.J. Quelch leg.; BMNH 1895.3.30.1.

Other material

GUYANA • 2 ♂♂, 2 ♀♀; Monte Roraima [frontier between Brazil and Guyana]; 14 Mar. 1899; J.J. Quelch leg.; BMNH 1899.3.14–23.

VENEZUELA – Bolívar • 1 ♀; Monte Roraima; Parque Nacional Canaima, Trilha Chirimatá; [5°20'00" N, 61°30'00" W]; 15 Nov. 2001; M.O. Gonzaga leg.; IBSP 23131.

Description

Male (BMNH 1895.3.30.1)

COLOR. Exemplar probably discolored. Carapace reddish brown, darker in cephalic region (Fig. 13A). Labium, sternum and endites reddish brown. Chelicerae reddish brown. Legs I–III brown, darker at tarsi. The metatarsus and tarsus of leg IV are lost. Abdomen brown with dark dorsal spots (Fig. 13A).

MEASUREMENTS. Total length 11.3, carapace length 5.3, width 4.2. Clypeus height 0.175. Eye diameters and interdistances: AME 0.15, ALE 0.22, PME 0.26, PLE 0.26; AME–AME 0.08, AME–ALE 0.05, PME–PME 0.18, PME–PLE 0.2, ALE–PLE 0.13. Chelicerae 1.95 long, with five promarginal teeth and seven retromarginal denticles.

LEG MEASUREMENTS. I—femur 5.1/patella 2.3/tibia 5.2/metatarsus 4.6/tarsus 2.2/total 19.4; II—5.0/2.3/4.8/4.3/1.6/18.0; III—4.2/1.9/3.5/3.9/1.4/14.9; IV—5.3/2.1/4.6/12.0.

LEG SPINATION. I—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus v2-0-0, p1-0-0, r1-0-0; II—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus p1-0-0, r1-0-0; III—tibia p1-1-0, r1-1-0; IV—tibia r1-1-0.

PALP. Retrolateral tibial apophysis branching and prolateral tibial apophysis short; cymbium without retrolateral projection; embolus long; apophysis at the base of the embolus short with the apex curved; median apophysis slender and curved; ventral tegular process with hyaline area; projected subtegulum; sperm duct in vertical position with secondary looping reaching the apex of the tegulum (Fig. 13C–E).

ABDOMEN. Length 5.6, epigastric furrow 0.89 from tracheal spiracle, spiracle 2.75 from base of spinnerets.

Female (BMNH 1899.3.14)

COLOR. Exemplar probably discolored. Carapace brown, darker in cephalic region (Fig. 13B). Labium, sternum and endites reddish brown. Chelicerae reddish brown. Legs I–IV brown, darker at tarsi. Abdomen gray with dorsal spots (Fig. 13B).

MEASUREMENTS. Total length 11.8, carapace length 5.3, width 3.9. Clypeus height 0.17. Eye diameters and interdistances: AME 0.13, ALE 0.26, PME 0.25, PLE 0.25; AME–AME 0.38, AME–ALE 0.06,

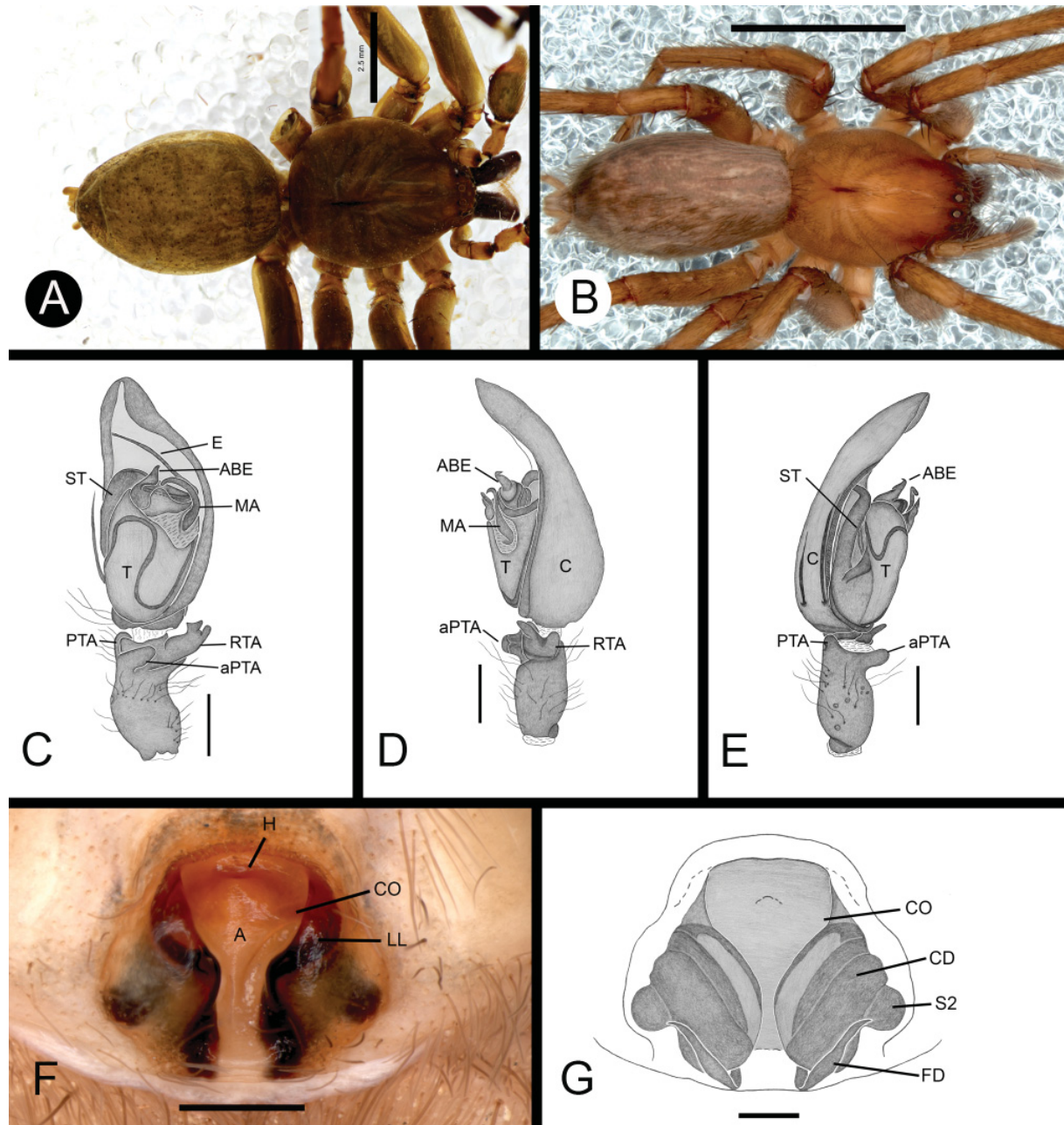


Fig. 13. *Tafana quelchi* (Pocock, 1895) (A, C–E= ♂, BMNH 1895.3.30.1; B ♀, IBSP 32131; F–G= ♀, IBSP 32131). A. Habitus, dorsal view. B. Habitus, dorsal view. C. Left palp, ventral view. D. Left palp, retrolateral view. E. Left palp, prolateral view. F. Epigynum, ventral view. G. Vulva, dorsal view. Abbreviations: A=atrium; ABE=apophysis of base of the embolus; aPTA=apical prolateral tibial apophysis; C=cymbium; CD=copulatory ducts; CO=copulatory opening; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; MA=median apophysis; PTA=prolateral tibial apophysis; RTA=retrolateral tibial apophysis; ST=subtegulum; S2=secondary spermathecae; T=tegulum. Scale bars: A–B=3.5 mm; C–G=0.25 mm.

PME–PME 0.26, PME–PLE 0.22, ALE–PLE 0.12. Chelicerae 2.65 long, with four promarginal teeth and eight retromarginal denticles.

LEG MEASUREMENTS. I—femur 4.95/patella 2.3/tibia 4.8/metatarsus 4.1/tarsus 0.0/total 16.15; II—absent; III—absent; IV—4.5/2.1/4.7/6.1/1.75/19.15.

LEG SPINATION. I—tibia v2-2-2, p0-1-0, r1-1-1, metatarsus v2-0-0, p1-0-0, r1-0-0; IV—tibia p1-1-1.

EPIGYNUM. Anterior field, hood circular; lateral lobes sinuous, largest in the anterior region; atrium wide with depression in the median field. Internally, copulatory ducts large and coiled, covering the primary spermathecae; secondary spermathecae rounded and fertilization ducts long (Figs 13F–G, 32H).

ABDOMEN. Length 6.5, epigastric furrow 1.17 from tracheal spiracle, spiracle 3.25 from base of spinnerets.

Distribution

Venezuela (Fig. 34).

Tafana kunturmarqa sp. nov.

urn:lsid:zoobank.org:act:DF812485-CC76-40AF-A647-C36685CAEB9F

Figs 14, 32I, 35

Diagnosis

Males of *Tafana kunturmarqa* sp. nov. resemble those of *T. straminea* and *T. ruizi* sp. nov. by having the retrolateral tibial apophysis conical, but differs by having the embolus short and the apophysis at the base of the embolus larger (Fig. 14C–E). Females resemble those of *T. straminea* and *T. ruizi* sp. nov. by having the epigynal plate with atrial septum, but differ by having the secondary spermathecae above the primary spermathecae, rounded, and fertilization ducts smaller than primary spermathecae (Figs 14F–G, 32I).

Etymology

The specific name, a noun in apposition, is a tribute to the Pre-Colombian language ‘Quechua’, originated in the central Andes. The meaning of the expression ‘Kuntur marqa’ in this language is ‘Condor’s nest’.

Material examined

Holotype

COLOMBIA • 1 ♂; Cundinamarca Department, La Calera; [4°43′11″ N, 73°58′12″ W]; 30 Jun. 1978; C. Hernandez leg.; ICN-Ar.

Paratype

COLOMBIA • 1 ♀; same collection data as for holotype; ICN-Ar.

Other material

COLOMBIA – Boyacá • 1 ♀; Santa Maria; [4°51′36″ N, 73°15′46″ W]; 9 Jun. 2000; G. Amaty leg.; IBSP 258327.

Description

Male (holotype, ICN-Ar)

COLOR. Exemplar probably discolored. Carapace orange, darker in cephalic region (Fig. 14A). Labium, sternum and endites reddish brown. Chelicerae reddish brown. Legs I–IV yellow, darker at tarsi. Abdomen yellow with dark longitudinal spots (Fig. 14A).

MEASUREMENTS. Total length 8.1, carapace length 3.6, width 2.6. Clypeus height 0.08. Eye diameters and interdistances: AME 0.1, ALE 0.14, PME 0.14, PLE 0.14; AME–AME 0.06, AME–ALE 0.08, PME–PME 0.2, PME–PLE 0.2, ALE–PLE 0.02. Chelicerae 1.8 long, with three promarginal teeth and four retromarginal denticles.

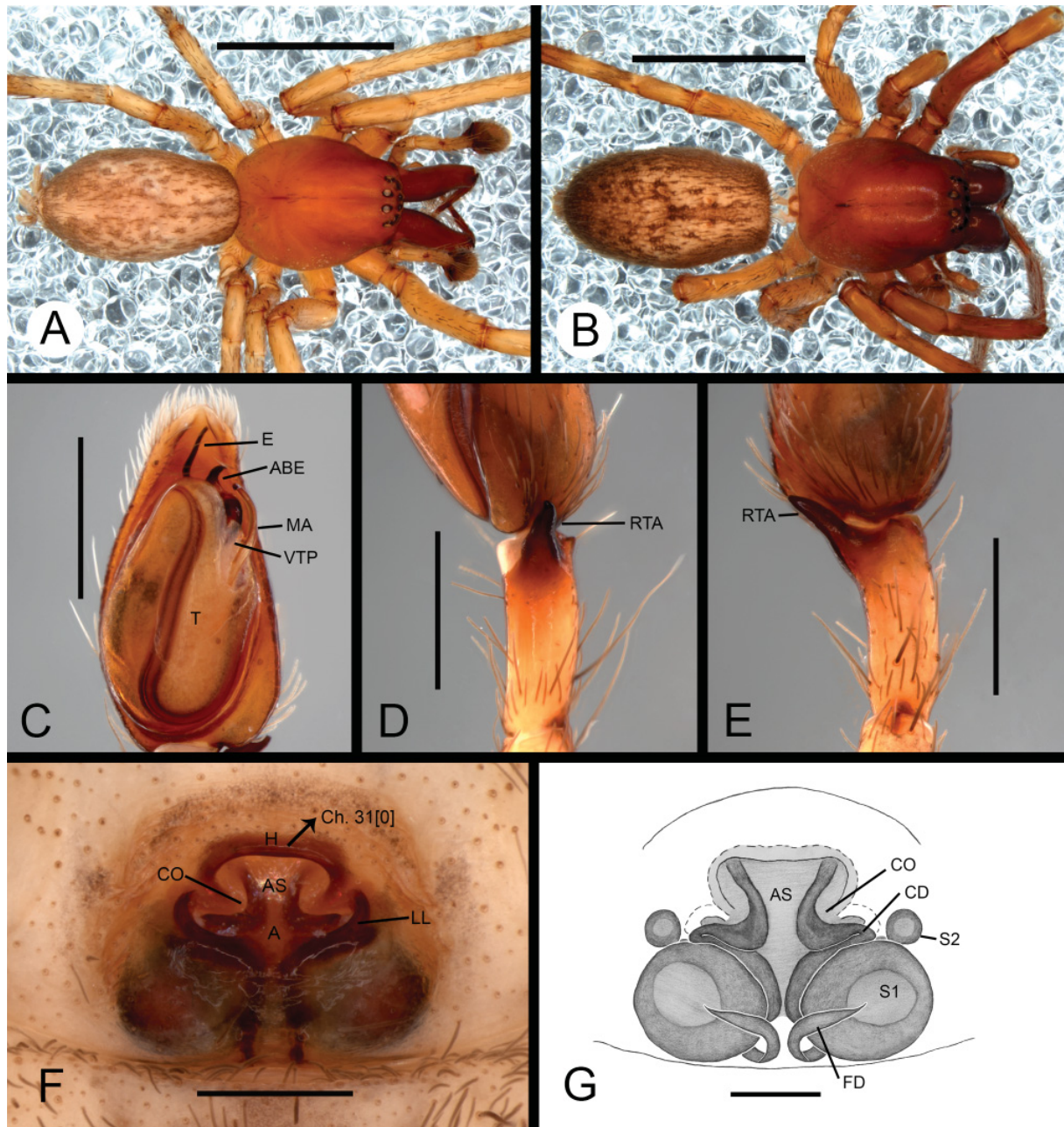


Fig. 14. *Tafana kunturmarqa* sp. nov. (A, C–E=holotype, ♂, ICN-Ar; B, F–G=paratype, ♀, ICN-Ar). A. Habitus, dorsal view. B. Habitus, dorsal view. C. Left palp, ventral view. D. Left palp, retrolateral view. E. Left palp, dorsal view. F. Epigynum, ventral view (arrow indicating character). G. Vulva, dorsal view. Abbreviations: A=atrium; ABE=apophysis of base of the embolus; AS=atrial septum; CD=copulatory ducts; Ch=character; CO=copulatory opening; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; MA=median apophysis; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum; VTP=ventral tegular process. Scale bars: A–B=3.5 mm; C–E=0.66 mm; F=0.4 mm; G=0.25 mm.

LEG MEASUREMENTS. I—femur 2.6/patella 1.4/tibia 2.53/metatarsus 2.1/tarsus 1.0/total 9.63; II—2.5/1.1/2.2/2.0/0.9/8.7; III—1.9/1.0/1.2/1.6/0.6/6.3; IV—2.5/1.22/2.3/2.6/0.7/9.32.

LEG SPINATION. I—tibia v1-1-0, metatarsus v2-0-0; II—tibia v0; III—tibia p0-0-1, r0-0-1, metatarsus v2-0-2, p0-0-1; IV—tibia v1-2-2, r1-1-0, metatarsus v2-1-2.

PALP. Retrolateral tibial apophysis conical with apex lightly curved; cymbium with retrolateral projection; short embolus; ventral tegular process near the median apophysis; sperm duct in vertical position with secondary loop reaching the apex of the tegulum; median apophysis long and curved at the apex (Fig. 14C–E).

ABDOMEN. Length 4.2, epigastric furrow 0.9 from tracheal spiracle, spiracle 1.8 from base of spinnerets.

Female (paratype, ICN-Ar)

COLOR. Exemplar probably discolored. Coloration as in males of this species (Fig. 14B).

MEASUREMENTS. Total length 7.8, carapace length 3.4, width 2.9. Clypeus height 0.08. Eye diameters and interdistances: AME 0.12, ALE 0.14, PME 0.14, PLE 0.14; AME–AME 0.04, AME–ALE 0.06, PME–PME 0.16, PME–PLE 0.14, ALE–PLE 0.02. Chelicerae 2.1 long, with three promarginal teeth and four retromarginal denticles.

LEG MEASUREMENTS. I—femur 3.2/patella 1.5/tibia 3.42/metatarsus 3.1/tarsus 1.2/total 12.42; II—3.0/1.5/3.0/2.8/1.1/11.4; III—2.2/1.1/1.5/1.9/0.6/7.3; IV—3.0/1.22/2.61/3.1/0.8/10.73.

LEG SPINATION. I—tibia v1-1-1, metatarsus v2-0-0; II—tibia v0-1-1; III—tibia v1-2-2, metatarsus v2-0-2; IV—tibia v1-2-2, p0-1-0, r1-1-0.

EPIGYNUM. Hood circular and sclerotized; epigynal plate posterior region covered by cuticle; atrial septum present; lateral lobes sinuous. Internally, copulatory ducts narrow; primary spermathecae oval and large; secondary spermathecae rounded and large, with short fertilization ducts (Figs 14F–G, 32I).

ABDOMEN. Length 4.3, epigastric furrow 0.8 from tracheal spiracle, spiracle 1.8 from base of spinnerets.

Distribution

Known only from Colombia (Fig. 35).

Tafana humahuaca sp. nov.

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Figs 15, 32J, 35

Diagnosis

Males of *Tafana humahuaca* sp. nov. resemble those of *T. riveti* and *T. nevada* sp. nov. by having the short embolus, but differ by having the apophysis at the base of the embolus truncated, extremely short and with excavation between the base of the embolus and the apophysis (Fig. 15C–E). Females resemble those of *Tafana nevada* sp. nov. by having the epigynal plate, but differ by having atrium narrow in the anterior region, small hood with lateral lobes extremely curved in the anterior region (Figs 15F–G, 32J).

Etymology

The specific name, a noun in apposition, is a tribute to ‘Quebrada de Humahuaca’, a deep canyon located in Jujuy Province, the type locality.

Material examined

Holotype

ARGENTINA • 1 ♂; Jujuy Province, Santa Bárbara; [24°18'31" S, 64°39'37" W]; Oct. 1969; G. Williner leg.; MACN-Ar 41787.

Paratype

ARGENTINA • 1 ♀; same collection data as for holotype; Oct. 1962; MACN-Ar 41788.

Description

Male (holotype, MACN-Ar 41787)

COLOR. Exemplar probably discolored. Carapace orange (Fig. 15A). Labium, sternum and endites yellow. Chelicerae yellow. Legs I–III yellow with spots on the articles. Abdomen with dark spots (Fig. 15A).

MEASUREMENTS. Total length 5.3, carapace length 2.3, width 1.7. Clypeus height 0.06. Eye diameters and interdistances: AME 0.06, ALE 0.1, PME 0.1, PLE 0.08; AME–AME 0.02, AME–ALE 0.02, PME–PME 0.1, PME–PLE 0.08, ALE–PLE 0.02. Chelicerae 0.8 long, with five promarginal teeth and four retromarginal denticles.

LEG MEASUREMENTS. I—lost; II—femur 1.7/patella 0.73/tibia 1.7/metatarsus 1.6/tarsus 0.84/total 6.57; III—1.6/0.7/1.4/1.4/0.7/5.8; IV—lost.

LEG SPINATION. II—tibia v2-1-2, p1-1-0; III—tibia v1-2-0, p0-1-0, metatarsus v2-1-0, p0-1-0.

PALP. Retrolateral tibial apophysis conical with apex curved; cymbium with retrolateral projection more rounded; embolus short; ventral tegular process near the median apophysis and sclerotized; sperm duct in vertical position with secondary looping reaching the apex of the tegulum; median apophysis slender and curved apically (Fig. 15C–E).

ABDOMEN. Length 2.7, epigastric furrow 0.6 from tracheal spiracle, spiracle 1.0 from base of spinnerets.

Female (paratype, MACN-Ar 41788)

COLOR. Exemplar probably discolored. Coloration as in males of this species (Fig. 15B).

MEASUREMENTS. Total length 3.2, carapace length 2.4, width 1.3. Clypeus height 0.06. Eye diameters and interdistances: AME 0.08, ALE 0.1, PME 0.1, PLE 0.1; AME–AME 0.04, AME–ALE 0.04, PME–PME 0.16, PME–PLE 0.12, ALE–PLE 0.04. Chelicerae 1.1 long, with four promarginal teeth and five retromarginal denticles.

LEG MEASUREMENTS. I—femur 1.6/patella 0.8/tibia 1.4/metatarsus 1.3/tarsus 0.8/total 5.9; II—1.9/0.8/1.1/1.15/0.6/5.55; III—1.3/0.63/0.8/1.2/0.5/4.43; IV—1.9/0.8/1.5/2.1/0.65/6.95.

LEG SPINATION. I—tibia v2-2-0, metatarsus v2-0-0; II—tibia v1-1-0; III—tibia v1-2-2, p1-1-0, r1-1-0, metatarsus v2-1-2; IV—tibia v1-2-2, p1-1-1.

EPIGYNUM. Hood semicircular and sclerotized; short atrium; lateral lobes over copulatory ducts. Internally, copulatory ducts narrow; primary spermathecae large and oval; secondary spermathecae above the primary spermathecae and rounded; fertilization ducts long (Fig. 15F–G).

ABDOMEN. Length 3.2, epigastric furrow 0.7 from tracheal spiracle, spiracle 1.3 from base of spinnerets.

Distribution

Known only from Jujuy, Argentina (Fig. 35).

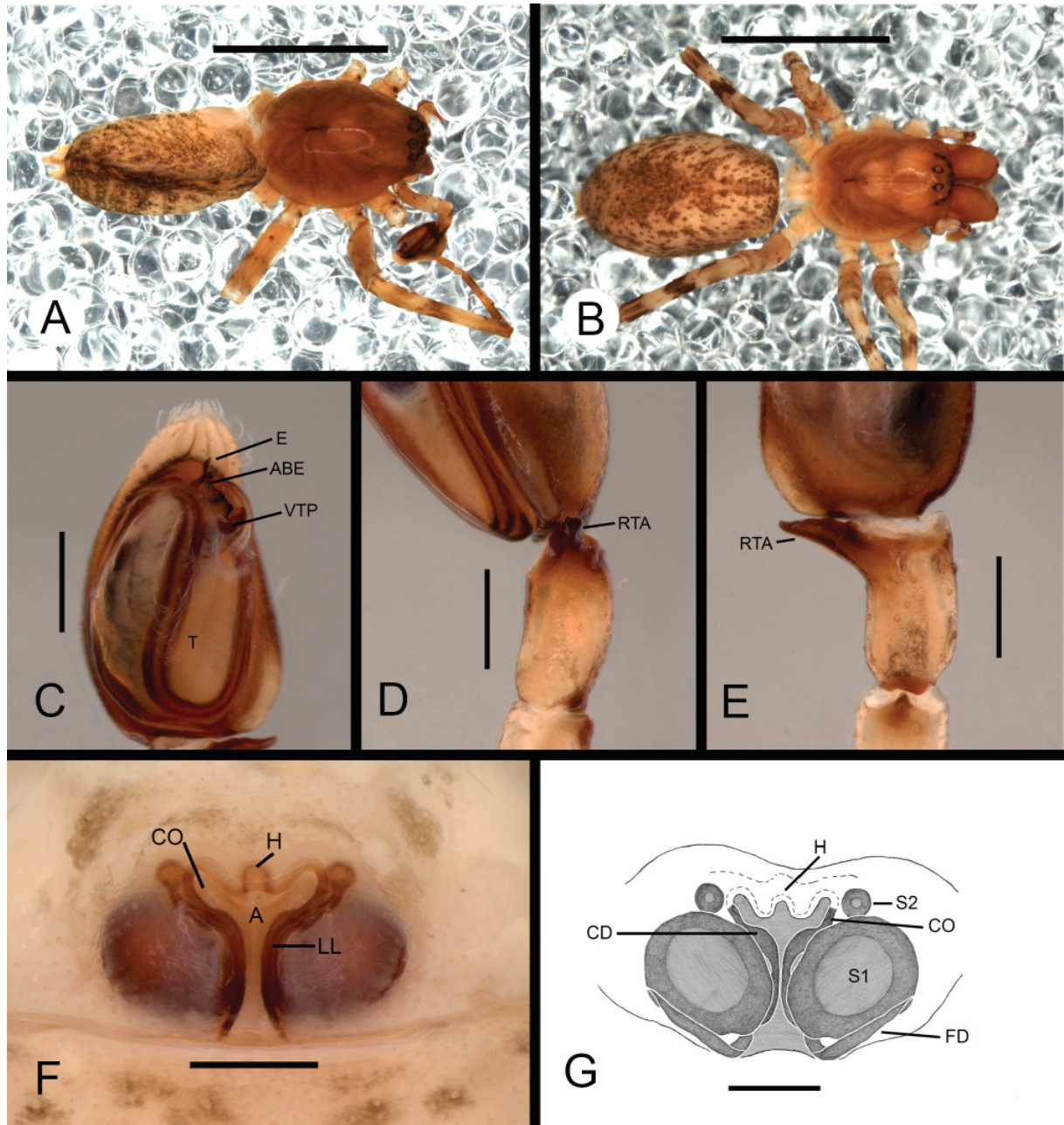


Fig. 15. *Tafana humahuaca* sp. nov. (A, C–E=holotype, ♂, MACN-Ar 41787; B, F–G=paratype, ♀, MACN-Ar 41788). **A.** Habitus, dorsal view. **B.** Habitus, dorsal view. **C.** Left palp, ventral view. **D.** Left palp, retrolateral view. **E.** Left palp, dorsal view. **F.** Epigynum, ventral view. **G.** Vulva, dorsal view. Abbreviations: A=atrium; ABE=apophysis of base of the embolus; CD=copulatory ducts; CO=copulatory opening; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum; VTP= ventral tegular process. Scale bars: A–B=3.5 mm; C–G=0.25 mm.

***Tafana pastaza* sp. nov.**

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Figs 8L, 16, 32K, 35

Diagnosis

Males of *Tafana pastaza* sp. nov. differ from those of the other species of this genus by having the apophysis at the base of the embolus bifid, primary apophysis ‘S-shaped’ and secondary apophysis large, retrolateral projection of the cymbium keel-shaped (Fig. 16C–E). Females differ from the others by presenting internal copulatory ducts long and sinuous, with a globose extension proximally of the copulatory ducts (Figs 16F–G, 32K).

Etymology

The specific name is a noun in apposition taken from the type locality, Pastaza Valley.

Material examined

Holotype

ECUADOR • 1 ♂; Tungurahua Province, Pastaza Valley, between Baños and Mera; [01°04′00″ N, 78°00′24″ W]; 1 Mar. 1949; W.C. Macintyre leg.; AMNH.

Paratype

ECUADOR • 1 ♀; same collection data as for holotype; AMNH.

Remark

The male specimen is in very bad shape, having lost the chelicerae and almost all the legs, and with the abdomen partially deteriorated (Fig. 16A).

Description

Male (holotype, AMNH)

COLOR. Exemplar discolored. Carapace reddish brown (16A). Labium, sternum and endites reddish brown. Legs reddish, only right femur IV and left femur III intact. Abdomen discolored (Fig. 16A).

MEASUREMENTS. Total length 8.5, carapace length 3.3, width 2.9. Clypeus height 0.08. Eye diameters and interdistances: AME 0.08, ALE 0.12, PME 0.12, PLE 0.1; AME–AME 0.06, AME–ALE 0.06, PME–PME 0.16, PME–PLE 0.20, ALE–PLE 0.06.

LEG MEASUREMENTS. III—femur 3.2; IV—femur 4.38.

PALP. Retrolateral tibial apophysis conical and curved, apical protuberance on the tibia in retrolateral view; cymbium with retrolateral projection keel-shaped; embolus long; subtegulum prolateral projected; ventral tegular process not present; sperm duct secondary loop reaching apex of the tegulum; median apophysis thick and curved at the apex (Fig. 16C–E).

ABDOMEN. Length 5.0, epigastric furrow 1.1 from tracheal spiracle, spiracle 3.2 from base of spinnerets.

Female (paratype, AMNH)

COLOR. Exemplar probably discolored. Carapace reddish brown (Fig. 16B). Labium, sternum and endites reddish brown. Chelicerae reddish brown. Legs I–IV yellow, darker at tarsi. Abdomen yellowish gray with dark spots (Fig. 16B).

MEASUREMENTS. Total length 9.3, carapace length 3.8, width 3.2. Clypeus height 0.12. Eye diameters and interdistances: AME 0.1, ALE 0.18, PME 0.18, PLE 0.18; AME–AME 0.08, AME–ALE 0.04, PME–

PME 0.2, PME–PLE 0.18, ALE–PLE 0.08. Chelicerae 1.6 long, with four promarginal teeth and five retromarginal denticles.

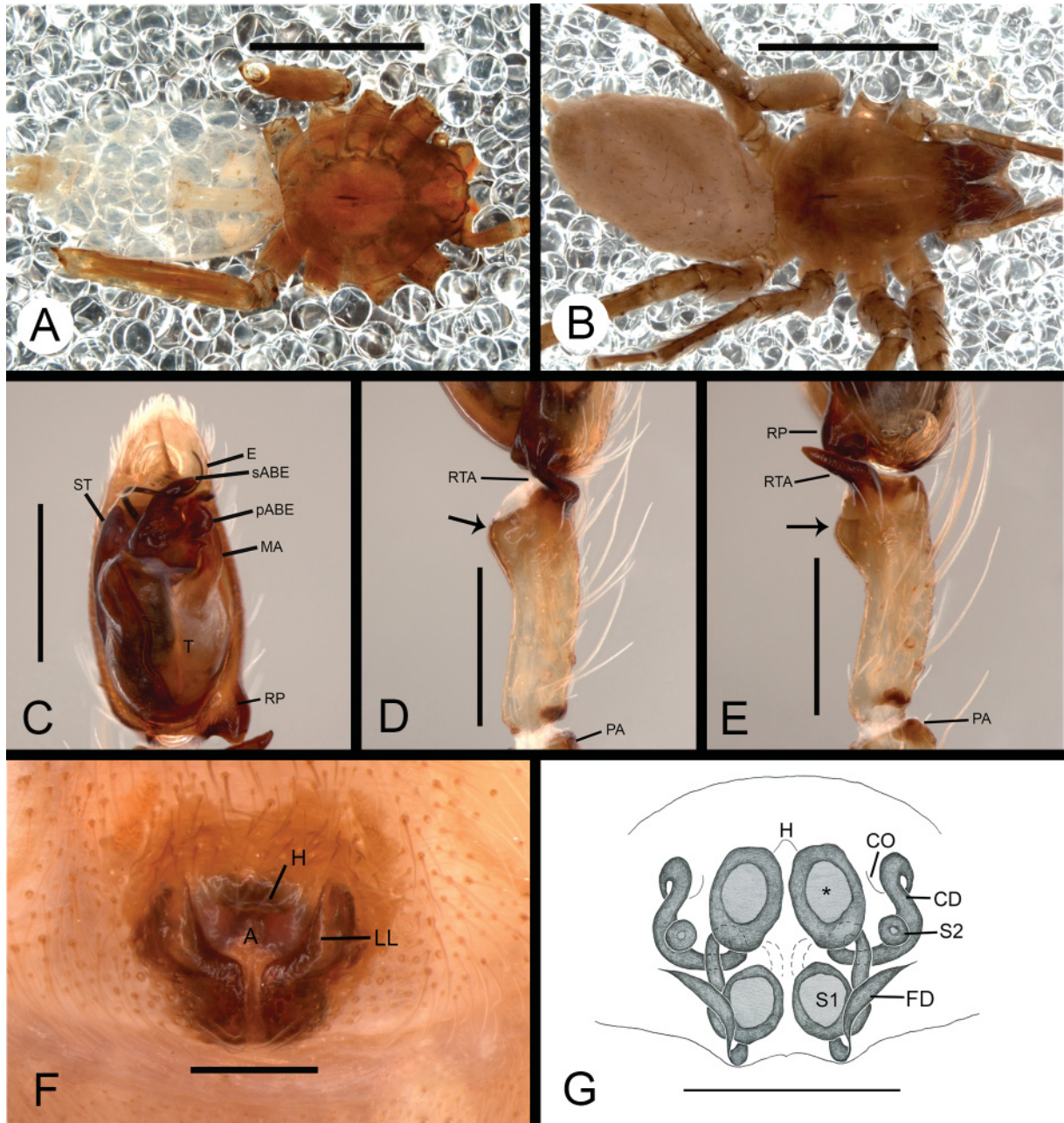


Fig. 16. *Tafana pastaza* sp. nov. (A, C–E=holotype, ♂, AMNH; B, F–G=paratype, ♀, AMNH). A. Habitus, dorsal view. B. Habitus, dorsal view. C. Left palp, ventral view. D. Left palp, retrolateral view (arrow indicating apical salience). E. Left palp, retrodorsal view (arrow indicating apical salience). F. Epigynum, ventral view. G. Vulva, dorsal view. Abbreviations: A=atrium; CD=copulatory ducts; CO=copulatory opening; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; MA=median apophysis; PA=patellar apophysis; pABE=primary apophysis of base of the embolus; RP=retrolateral projection; RTA=retrolateral tibial apophysis; sABE=secondary apophysis of base of the embolus; S1=primary spermathecae; S2=secondary spermathecae; ST=subtegulum, T=tegulum. Asterisks to globose membranous extension of proximal copulatory ducts. Scale bars: A–B=3.5 mm; C–E=0.66 mm; F–G=0.25 mm.

LEG MEASUREMENTS. I—femur 4.4/patella 1.7/tibia 4.7/metatarsus 3.6/tarsus 1.8/total 16.2; II—4.5/1.7/4.5/3.4/1.7/15.8; III—3.3/1.4/2.5/3.1/1.3/11.6; IV—3.9/1.4/3.3/4.0/1.4/14.0.

LEG SPINATION. I—tibia v2-2-2, p1-1-1, r1-1-1, metatarsus v2-0-0; II—tibia v2-2-2, p1-1-1, r1-1-1, metatarsus p1-0-0, r1-1-0; III—tibia p1-1-0, r1-1-0.

EPIGYNUM. Hood circular; atrium small; epigynal plate without posterior region covered with sclerotized cuticle; lateral lobes chalice-shaped. Internally, copulatory ducts long and narrow; primary spermathecae oval; secondary spermathecae in the middle of the copulatory ducts; fertilization ducts long, two times the length of primary spermathecae (Figs 16F–G, 32K).

ABDOMEN. Length 5.3, epigastric furrow 1.3 from tracheal spiracle, spiracle 2.0 from base of spinnerets.

Distribution

Known only from Pastaza Valley, Ecuador (Fig. 35).

Tafana nevada sp. nov.

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Figs 17–18, 32L, 35

Diagnosis

Males of *Tafana nevada* sp. nov. resemble those of *T. riveti* and *T. humahuaca* sp. nov. by having the short embolus, but differ from the others by having the apophysis at the base of the embolus long and curved (Figs 17C–D, 18A–C). Females resemble those of *T. humahuaca* sp. nov. by having the epigynal plate with parallel lateral lobes, but differ by having a large atrium in the anterior region and a hyaline membrane in the posterior region (Figs 17F–G, 33L).

Etymology

The specific name is a noun in apposition taken from type locality, Sierra Nevada de Santa Marta.

Material examined

Holotype

COLOMBIA • 1 ♂; Sierra Nueva Granada, Sierra Nevada de Santa Marta; [10°52'00" N, 73°43'12" W]; 9 Apr. 1975; J.A. Kochalka leg.; AMNH.

Paratype

COLOMBIA • 1 ♀; San Pedro, Sierra Nevada de Santa Marta; [10°52'00" N, 73°43'12" W]; 26 Feb. 1975; J.A. Kochalka leg.; AMNH.

Other material

COLOMBIA – **Magdalena Departament** • 1 ♀; Santa Marta, San Pedro, Carmelo, Sierra Nevada de Santa Marta; [10°52'00" N, 73°43'12" W]; 26 Feb. 1975; J.A. Kochalka leg.; IBNP • 1 ♀; same collection data as for preceding; 3 Mar. 1975; J.A. Kochalka leg.; IBNP • 1 ♂; Santa Marta, SE of the Cerro, Yosagaca, Sierra Nevada de Santa Marta; [10°52'00" N, 73°43'12" W]; 30 Dec. 1973; J.A. Kochalka leg.; IBNP • 1 ♂; Sierra Nevada de Santa Marta, Sierra Nueva Granada; [10°52'00" N, 73°43'12" W]; 9 Apr. 1975; J.A. Kochalka leg.; IBNP • 1 ♀; Santa Marta, San Pedro, Carmelo, Sierra Nevada de Santa Marta; [10°52'00" N, 73°43'12" W]; 7 Feb. 1974; J.A. Kochalka leg.; IBSP 209872 • 1 ♂; Santa Marta, Sierra Nueva Granada; [10°52'00" N, 73°43'12" W]; 20 Feb. 1974; J.A. Kochalka leg.; IBSP 209873. – **Cordillera Oriental** • 2 ♀♀; Scorpa Mission, Serra del Perijá; [10°00'59" N, 72°57'28" W]; 10–22 Aug. 1968; B. Malkin leg.; AMNH. – **Cundinamarca** • 1 ♀; Sasaima, Finca Bella Vista; [4°57'54" N, 74°26'05" W]; 16 Mar. 1965; P.R. Craig leg.; CAS.

VENEZUELA – **Aragua** • 1 ♀; Rancho Grande; [10°38'30" N, 68°00'31" W]; 4 Mar. 1959; A.M. Nadler leg.; AMNH. – **Monagas** • 1 ♀; Caripe, Cueva del Guácharo; [10°10'09" N, 63°30'36" W]; 20–30 Jul. 1987; S. and J. Peck leg.; AMNH.

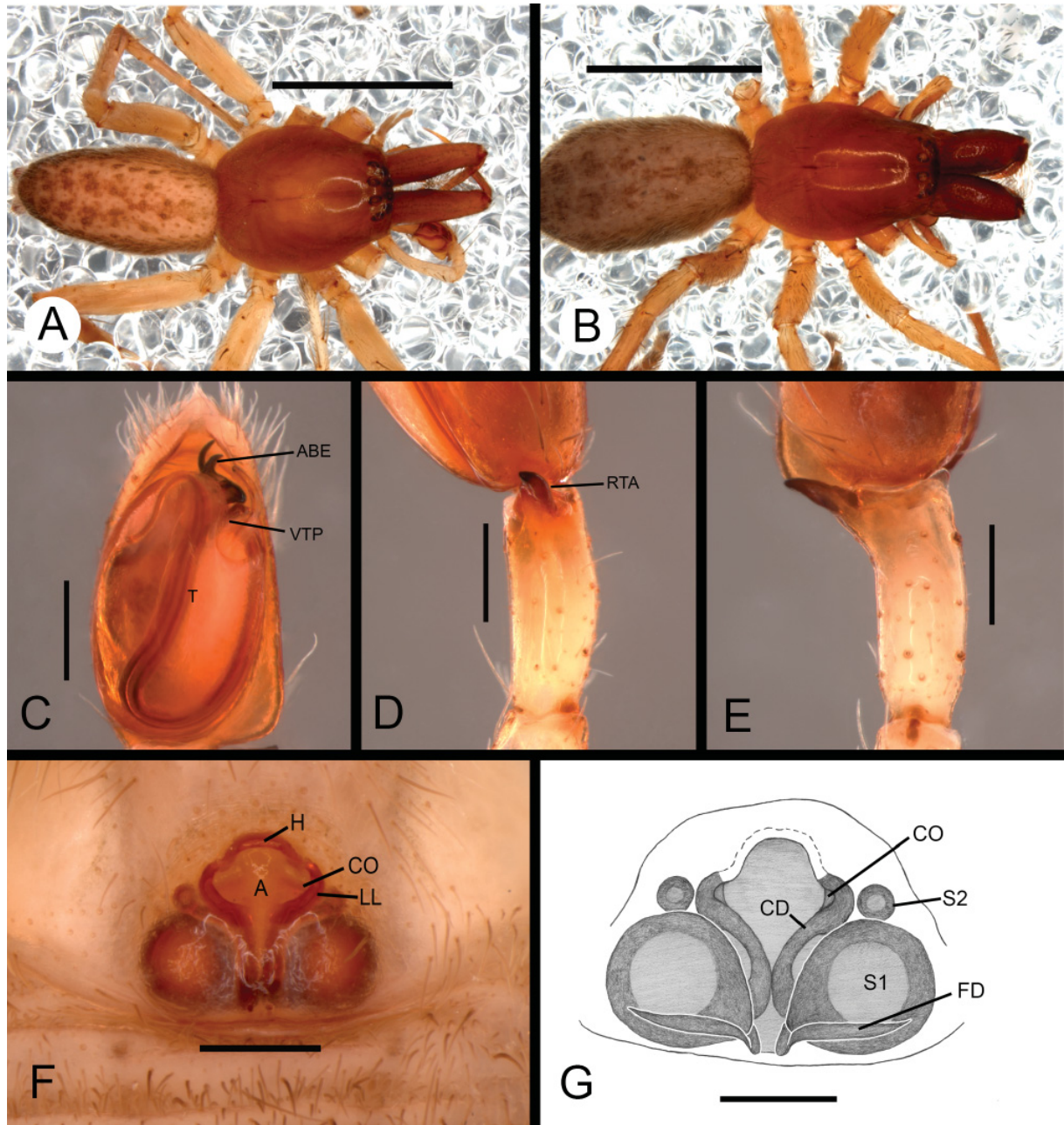


Fig. 17. *Tafana nevada* sp. nov. (A, C–E=holotype, ♂, AMNH; B, F–G= paratype, ♀, AMNH). A. Habitus, dorsal view. B. Habitus, dorsal view. C. Left palp, ventral view. D. Left palp, retrolateral view. E. Left palp, dorsal view. F. Epigynum, ventral view. G. Vulva, dorsal view. Abbreviations: A=atrium; ABE=apophysis of base of embolus; CD=copulatory ducts; CO=copulatory opening; FD=fertilization ducts; H=hood; LL=lateral lobes; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum, VTP=ventral tegular process. Scale bars: A–B=3.5 mm; C–G=0.25 mm.

Description

Male (holotype, AMNH)

COLOR. Exemplar probably discolored. Carapace reddish brown (Fig. 17A). Labium, sternum and endites reddish brown. Chelicerae reddish. Legs I–IV yellow, darker at tarsi. Abdomen yellow with dark spots (Fig. 17A).

MEASUREMENTS. Total length 5.6, carapace length 2.6, width 2.2. Clypeus height 0.06. Eye diameters and interdistances: AME 0.1, ALE 0.12, PME 0.14, PLE 0.12; AME–AME 0.06, AME–ALE 0.02, PME–PME 0.12, PME–PLE 0.14, ALE–PLE 0.02. Chelicerae 1.1 long, with four promarginal teeth and four retromarginal denticles.

LEG MEASUREMENTS. I—femur 2.5/patella 1.0/tibia 2.53/metatarsus 2.2/tarsus 0.9/total 9.13; II—2.3/1.0/2.2/2.0/0.8/8.3; III—1.8/0.62/1.9/1.2/0.6/6.12; IV—2.4/0.9/2.0/2.6/0.62/8.52.

LEG SPINATION. I—tibia v1-1-0, metatarsus v2-0-0; II—tibia v0-2-0, p0-1-0; III—tibia v1-2-2, p0-1-1, r1-1-0, metatarsus v2-1-2; IV—tibia r1-1-0, metatarsus v2-1-2.

PALP. Retrolateral tibial apophysis conical and curved; cymbium with retrolateral projection; apophysis at the base of the embolus long and curved; embolus extremely short; ventral tegular process near the median apophysis; median apophysis slender and curved; subtegulum not projected; sperm duct with secondary looping reaching the apex of the tegulum (Figs 17C–D, 18A–C).

ABDOMEN. Length 3.0, epigastric furrow 0.7 from tracheal spiracle, spiracle 1.1 from base of spinnerets.

Female (paratype, AMNH)

COLOR. Exemplar probably discolored. Carapace reddish brown (Fig. 17B). Labium, sternum and endites reddish brown. Chelicerae reddish brown. Legs I–IV yellow, darker at tarsi. Abdomen yellowish gray with dark spots (Fig. 17B).

MEASUREMENTS. Total length 5.9, carapace length 2.6, width 2.0. Clypeus height 0.04. Eye diameters and interdistances: AME 0.1, ALE 0.12, PME 0.12, PLE 0.1; AME–AME 0.06, AME–ALE 0.06, PME–

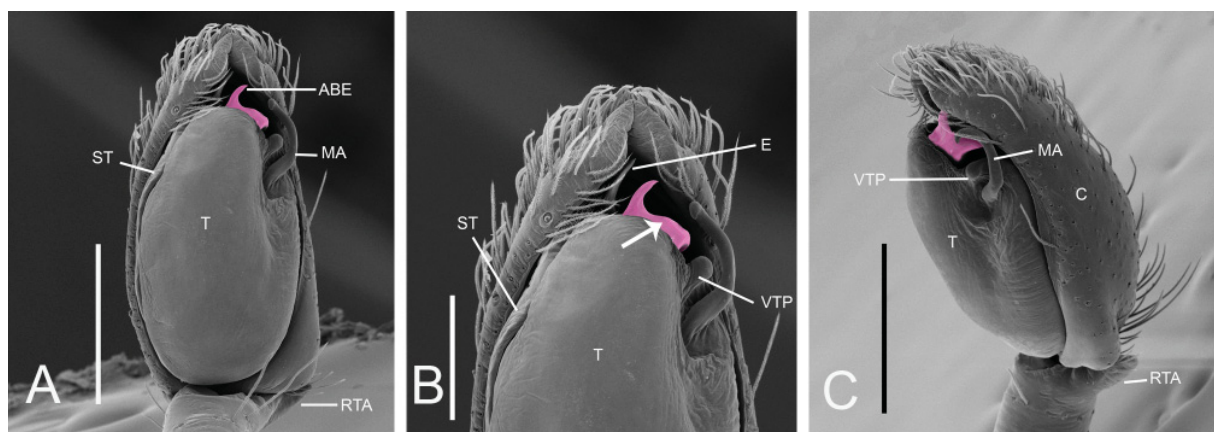


Fig. 18. *Tafana nevada* sp. nov., ♂ (IBNP). **A.** Left palp, ventral view. **B.** Left palp, ventral view (arrow indicating the base of the embolus). **C.** Left palp, retrolateral view. Abbreviations: ABE=apophysis of base of the embolus; C=cymbium; E=embolus; MA=median apophysis; RTA=retrolateral tibial apophysis; ST=subtegulum; T=tegulum; VTP=ventral tegular process. Scale bars: A, C=0.4 mm; B=0.2 mm.

PME 0.14, PME–PLE 0.12, ALE–PLE 0.04. Chelicerae 1.2 long, with four promarginal teeth and five retromarginal denticles.

LEG MEASUREMENTS. I—femur 1.88/patella 1.0/tibia 1.2/metatarsus 1.1/tarsus 0.7/total 5.88; II—1.7/0.9/1.4/1.2/0.6/5.8; III—1.1/0.6/0.9/1.1/0.4/4.1; IV—1.2/0.8/1.2/2.1/0.6/5.9.

LEG SPINATION. I—tibia v1-1-0, metatarsus v2-0-0; II—tibia v0-0-0; III—tibia v1-2-2, r1-1-0, metatarsus v2-1-2; IV—tibia v1-2-2, r1-1-0.

EPIGYNUM. Hood semicircular and sclerotized; broad atrium; lateral lobes covering copulatory ducts; posterior region covered by cuticle. Internally, copulatory ducts short; primary spermathecae large and oval; secondary spermathecae above the primary spermathecae and rounded; long fertilization ducts in horizontal position (Figs 17F–G, 33L).

ABDOMEN. Length 3.3, epigastric furrow 0.45 from tracheal spiracle, spiracle 1.4 from base of spinnerets.

Variation

Two males: total length 4.2–4.9; carapace 1.9–1.9; femur I 1.7–1.9. Ten females: total length 4.3–6.7; carapace 1.6–2.4; femur I 1.3–1.9.

Distribution

Venezuela and Colombia (Fig. 35).

Tafana huatanay sp. nov.

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Figs 19–20, 33A, 34

Diagnosis

Males of *Tafana huatanay* sp. nov. resemble those of *T. riveti*, *T. humahuaca* sp. nov. and *T. nevada* sp. nov. by having the short embolus, but differ by having the base of the embolus wide (Figs 19C, 20A–C). Females resemble those of *T. riveti*, *T. humahuaca* sp. nov. and *T. nevada* sp. nov. by having the epigynal plate with curved lateral lobes in anterior region, but differ by having the copulatory ducts medially flattened and secondary spermathecae on the sides of the primary spermathecae in dorsal view (Figs 19F–G, 33A).

Etymology

The specific name, a noun in apposition, is a tribute to the ‘Sacred Valley of the Incas’ called Huatanay.

Material examined

Holotype

PERU • 1 ♂; Cusco, Parque Wiñay Wuyana; [13°30'30" S, 71°58'18" W]; 10 Feb. 1990; D. Silva leg.; MUSM.

Paratype

PERU • 1 ♀; Paucartambo, Pilcopata, National Park Del Manu Carretera; [12°08'00" S, 71°40'00" W]; 2700 m a.s.l.; 19 Feb. 1990; D. Silva leg.; MUSM.

Other material

BOLIVIA – La Paz • 2 ♀♀; Sainami, Valley of the Zongo; [16°29'39" S, 68°08'51" W]; 4 Aug. 1993; A.D. Brescovit leg.; IBSP 258182.

COLOMBIA – **Neiva** • 1 ♀; Huila, Finca Meremberg, 10 km E of Santa Leticia; [2°59'55" N, 75°18'16" W]; Mar. 1979; W. Eberhard leg.; MCZ.

ECUADOR – **Quito** • 3 ♂♂, 1 ♀; Golf Club; [0°15'00" S, 78°35'00" W]; 21 Jul. 1958; A.M. Nadler leg.; AMNH.

PERU – **Cusco** • 3 ♀♀; Carretera to Manu National Park, Paucartambo, Pilcopata; [12°08'00" S, 71°40'00" W]; 17–19 Feb. 1990; D. Silva leg.; MUSM • 1 ♂; same collection data as for preceding but 18 Feb. 1990; MUSM • 1 ♂; Calca, Hacienda Urco; [13°19'09" S, 71°57'1700" W]; 15 Oct. 1939; K.P. Schmidt leg.; FMNH.

Description

Male (holotype, MUSM)

COLOR. Carapace orange (Fig. 19A). Labium, sternum and endites yellow. Chelicerae reddish. Legs I–IV yellow, darker at tarsi. Abdomen gray with dark spots (Fig. 19A).

MEASUREMENTS. Total length 5.6, carapace length 2.7, width 2.1. Clypeus height 0.06. Eye diameters and interdistances: AME 0.06, ALE 0.1, PME 0.12, PLE 0.1; AME–AME 0.06, AME–ALE 0.06, PME–PME 0.14, PME–PLE 0.14, ALE–PLE 0.04. Chelicerae 1.7 long, with four promarginal teeth and four retromarginal denticles.

LEG MEASUREMENTS. I—femur 2.2/patella 0.9/tibia 2.1/metatarsus 1.8/tarsus 1.0/total 8.0; II—2.0/1.0/1.9/1.7/0.9/7.5; III—1.8/0.9/1.3/1.5/0.5/6.0; IV—2.5/1.1/2.15/2.7/0.7/9.15.

LEG SPINATION. I—tibia v2-2-2, metatarsus v2-0-0; II—tibia v1-2-2, p0-1-0; III—tibia v1-2-2, p0-1-1, r0-1-1; IV—tibia p1-1-1.

PALP. Retrolateral tibial apophysis short and curved; cymbium with retrolateral projection; apophysis at the base of the embolus short and furrowed; embolus short; ventral tegular process near the median apophysis; sperm duct with secondary looping reaching the apex of the tegulum (Figs 19C–E, 20A–C).

ABDOMEN. Length 2.8, epigastric furrow 0.7 from tracheal spiracle, spiracle 1.0 from base of spinnerets.

Female (paratype, MUSM)

COLOR. Coloration as in males of this species, except for reddish carapace and chelicerae reddish brown (Fig. 19B).

MEASUREMENTS. Total length 6.0, carapace length 2.1, width 1.7. Clypeus height 0.06. Eye diameters and interdistances: AME 0.06, ALE 0.1, PME 0.1, PLE 0.1; AME–AME 0.04, AME–ALE 0.04, PME–PME 0.12, PME–PLE 0.12, ALE–PLE 0.04. Chelicerae 1.1 long, with four promarginal teeth and three retromarginal denticles.

LEG MEASUREMENTS. I—femur 1.5/patella 0.63/tibia 1.3/metatarsus 1.1/tarsus 0.6/total 5.13; II—1.42/0.5/1.1/1.1/0.6/4.72; III—1.2/0.6/0.8/1.1/0.4/4.1; IV—1.6/0.6/1.3/1.4/0.6/5.5.

LEG SPINATION. I—tibia v2-2-0, metatarsus v2-0-0; II—tibia v2-2-0; III—tibia v1-2-2, p0-1-1, r0-1-1, metatarsus v2-1-2; IV—tibia p0-1-1, r0-1-1.

EPIGYNUM. Hood semicircular, with sclerotized lateral lobes; atrium narrow and elongated; epigynal plate covered by cuticle in the posterior region; lateral lobes extremely curved in anterior region. Internally,

copulatory ducts sinuous and flattened; primary spermathecae large and oval; secondary spermathecae lateral to the primary spermathecae, rounded, and fertilization ducts long (Figs 19F–G, 20E, 33A).

ABDOMEN. Length 3.8, epigastric furrow 0.8 from tracheal spiracle, spiracle 1.7 from base of spinnerets.

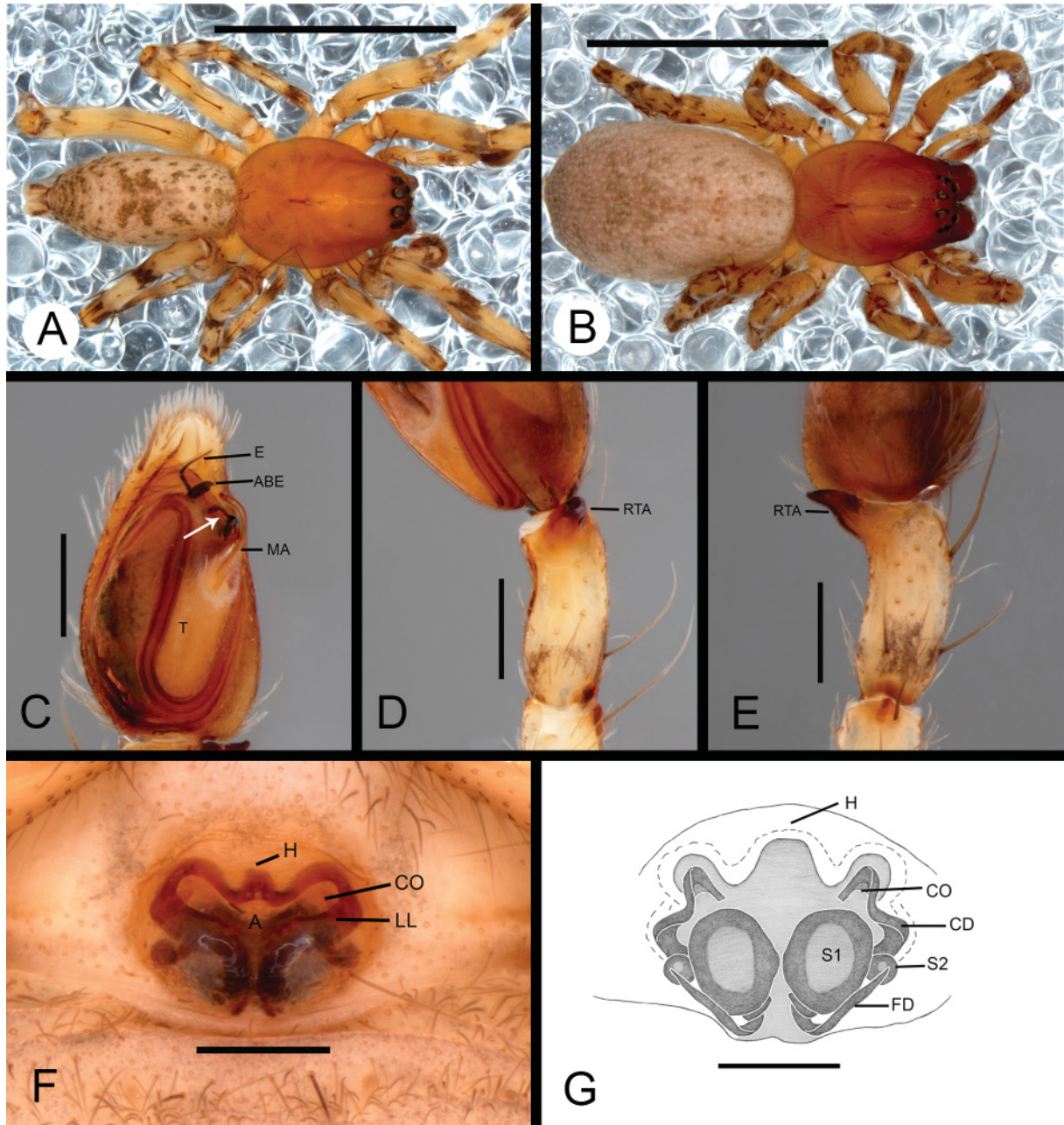


Fig. 19. *Tafana huatanay* sp. nov. (A, C–E=holotype, ♂, MUSM; B, F–G=paratype, ♀, MUSM). A. Habitus, dorsal view. B. Habitus, dorsal view. C. Left palp, ventral view (arrow indicating the base of the embolus). D. Left palp, retrolateral view. E. Left palp, dorsal view. F. Epigynum, ventral view. G. Vulva, dorsal view. Abbreviations: A=atrium; ABE=apophysis of base of the embolus; CD=copulatory ducts; CO=copulatory opening; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; MA=median apophysis; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum. Scale bars: A–B=2.16 mm; C–G=0.25 mm.

Variation

Five males: total length 4.4–7.9; carapace 2.0–3.3; femur I 1.9–2.6. Six females: total length 4.3–5.3; carapace 1.8–2.0; femur I 1.3–1.5.

Distribution

Colombia, Ecuador, Peru and Bolivia (Fig. 34).

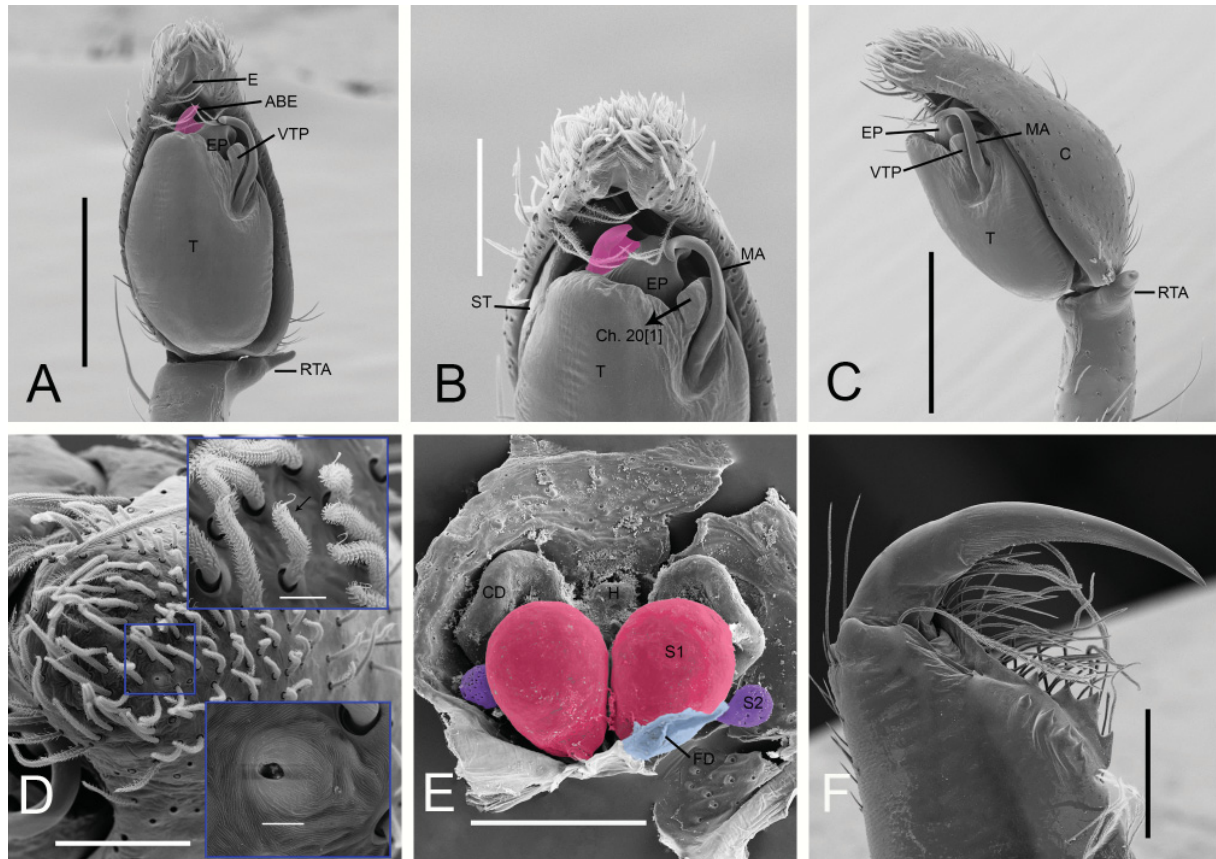


Fig. 20. *Tafana huatanay* sp. nov. (A–D, F = ♂, AMNH; E = ♀, AMNH). **A.** Left palp, ventral view. **B.** Left palp, ventral view (arrow indicating character). **C.** Left palp, retrolateral view. **D.** Left palp, frontal view (details of the patch of chemosensory setae and tarsal organ on the cymbium). **E.** Vulva, dorsal view. **F.** Right chelicera, ventral view. Abbreviations: ABE=apophysis of base of the embolus; C=cymbium; CD=copulatory ducts; Ch=character; E=embolus; EP=embolic process; FD=fertilization ducts; H=hood; MA=median apophysis; RTA=retrolateral tibial apophysis; ST=subtegulum; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum; VTP=ventral tegular process. Scale bars: A, C=0.4 mm; B=0.2 mm; D=0.1 mm (details chemosensory setae=0.01 mm; tarsal organ=0.05 mm); E–F=0.2 mm.

Tafana ruizi sp. nov.

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Figs 21, 33B, 34

Diagnosis

Males of *Tafana ruizi* sp. nov. resemble those of *T. straminea* and *T. kunturmarqa* sp. nov. by having the base of the embolus large and inclined, but differ by having the ventral tegular process large and apex of tegulum not rounded (Fig. 21C). Females resemble those of *T. straminea* and *T. kunturmarqa* sp. nov. by having the atrial septum, but differ by having the wide atrium, showing the copulation openings and hood long and circular (Figs 21F–G, 33B).

Etymology

The specific name is a patronym in honor of the Cuban arachnologist Alexandre Sánchez-Ruiz for his contributions to the taxonomy of spiders.

Material examined

Holotype

COLOMBIA • 1 ♂; Departamento de Caldas, Pensilvania; [5°23'02" N, 75°09'40" W]; 10 Oct. 2003; A. Sánchez-Ruiz leg.; IBSP 258183.

Paratype

COLOMBIA • 1 ♀; same collection data as for holotype; IBSP 258183.

Description

Male (holotype, IBSP 258183)

COLOR. Carapace reddish brown (Fig. 21A). Labium, sternum and endites yellow. Chelicerae reddish brown. Legs I–IV yellow with spots, darker at tarsi. Abdomen dark with spots yellow in dorsal view (Fig. 21A).

MEASUREMENTS. Total length 6.9, carapace length 3.2, width 2.5. Clypeus height 0.1. Eye diameters and interdistances: AME 0.1, ALE 0.14, PME 0.14, PLE 0.14; AME–AME 0.08, AME–ALE 0.1, PME–PME 0.16, PME–PLE 0.16, ALE–PLE 0.04. Chelicerae 2.0 long, with four promarginal teeth and five retromarginal denticles.

LEG MEASUREMENTS. I—femur 2.7/patella 1.2/tibia 2.7/metatarsus 2.3/tarsus 1.1/total 10.0; II—2.5/1.1/2.5/2.0/1.0/9.1; III—2.0/0.9/1.4/1.7/0.6/6.6; IV—2.4/1.1/2.3/2.7/0.8/9.3.

LEG SPINATION. I—tibia v1-2-1-1-1, metatarsus v2-0-0; II—tibia v0-2-1; III—tibia v1-2-2, p0-0-1, r0-1-1, metatarsus v2-0-2, p0-1-1, r0-1-1; IV—tibia v1-2-2, r1-1-0, metatarsus v2-0-2.

PALP. Retrolateral tibial apophysis long and curved; cymbium with retrolateral projection; apophysis at the base of the embolus short and furrowed; embolus long; ventral tegular process wide and near the median apophysis; sperm duct with the secondary looping almost reaching apex of tegulum (Fig. 21C–E).

ABDOMEN. Length 3.6, epigastric furrow 0.9 from tracheal spiracle, spiracle 1.1 from base of spinnerets.

Female (paratype, IBSP 258183)

COLOR. Coloration as in males of this species, except for the reddish carapace and chelicerae reddish brown and robust (Fig. 21B). Abdomen gray with spots in dorsal view (Fig. 21B).

MEASUREMENTS. Total length 7.4, carapace length 3.0, width 2.4. Clypeus height 0.10. Eye diameters and interdistances: AME 0.12, ALE 0.14, PME 0.14, PLE 0.14; AME–AME 0.06, AME–ALE 0.06, PME–PME 0.2, PME–PLE 0.12, ALE–PLE 0.04. Chelicerae 1.2 long, with five promarginal teeth and six retromarginal denticles.

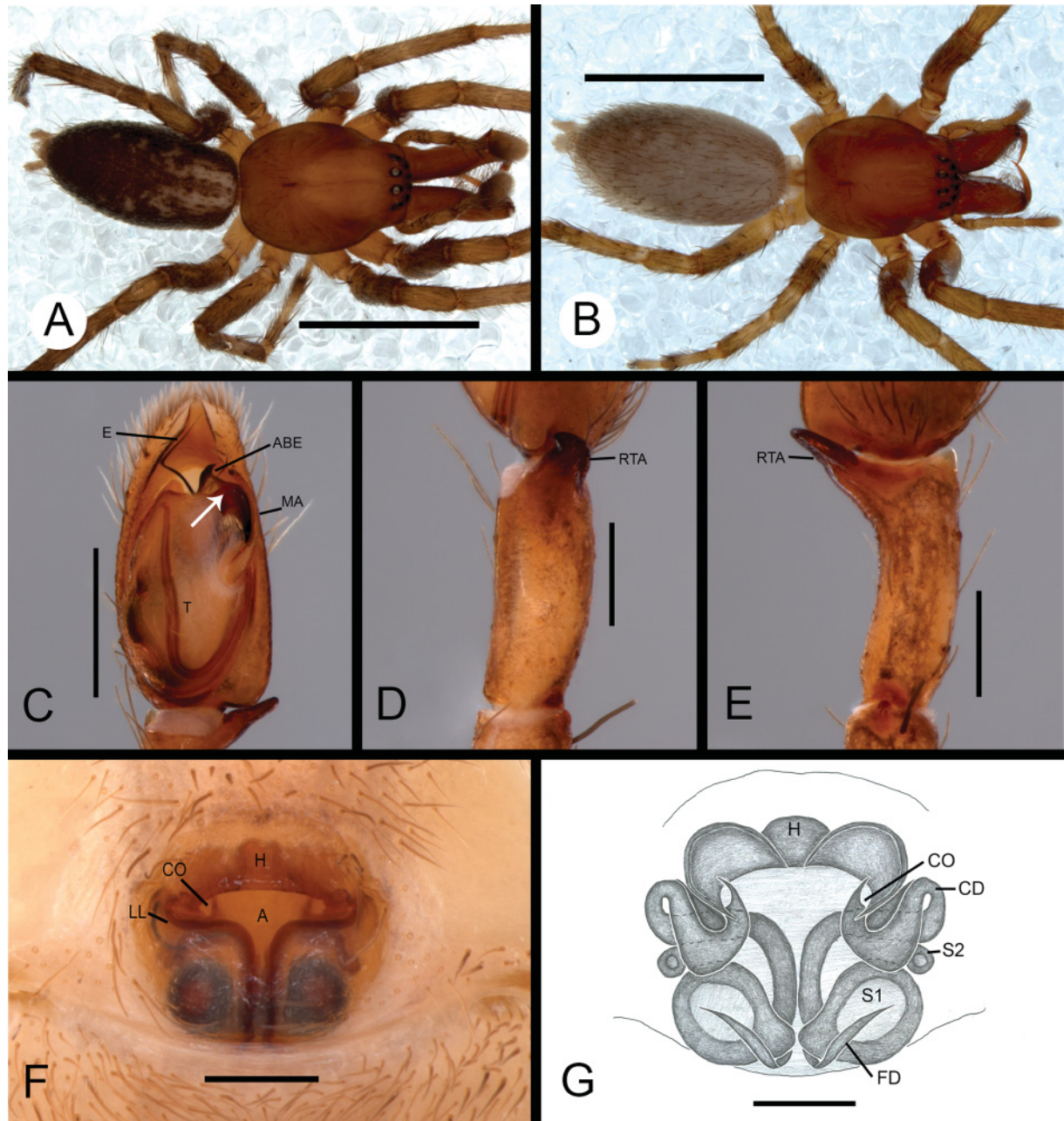


Fig. 21. *Tafana ruizi* sp. nov. (A, C–E=holotype, ♂, IBSP 258183; B, E–F=paratype, ♀, IBSP 258183). **A.** Habitus, dorsal view. **B.** Habitus, dorsal view. **C.** Left palp, ventral view (arrow indicating the base of the embolus). **D.** Left palp, retrolateral view. **E.** Left palp, dorsal view. **F.** Epigynum, ventral view. **G.** Vulva, dorsal view. Abbreviations: A=atrium; ABE=apophysis of base of the embolus; CD=copulatory ducts; CO=copulatory opening; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; MA=median apophysis; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum. Scale bars: A–B=3.5 mm; C=0.5 mm; D–G=0.25 mm.

LEG MEASUREMENTS. I—femur 2.1/patella 1.1/tibia 1.9/metatarsus 1.5/tarsus 0.8/total 7.4; II—2.0/1.1/1.8/1.5/0.8/7.2; III—1.52/0.9/1.1/1.4/0.5/5.42; IV—2.0/1.0/2.0/2.2/0.6/7.8.

LEG SPINATION. I—tibia v2-2-0, metatarsus v2-0-0; III—metatarsus v2-0-2, p1-0-1, r0-0-1; IV—tibia r0-1-0, metatarsus v2-0-2, p0-1-1, r0-1-1.

EPIGYNUM. Hood circular; atrial septum present; epigynal plate covered by cuticle in the posterior region; lateral lobes extremely curved in anterior region. Internally, copulatory ducts sinuous and laminar; primary spermathecae large and oval; secondary spermathecae short and rounded in the anterior region on the copulatory ducts; fertilization ducts long over the primary spermathecae (Figs 21F–G, 33B).

ABDOMEN. Length 4.1, epigastric furrow 0.98 from tracheal spiracle, spiracle 1.9 from base of spinnerets.

Distribution

Colombia (Fig. 34).

The *silhavyi* group

Diagnosis

Males of this group can be recognized by having the apophysis at the base of the embolus curved and laminar (Figs 9C–D, 22C, 23B, 26A–B); the sperm duct forming an inverted ‘S-shape’ in the male palp not expanded, with secondary looping in the middle of the tegulum (Figs 9A, 22C, 25C). The females can be recognized by having the atrium wide and copulatory ducts large in the anterior region (Figs 22G, 26D, 33D–F).

Included species

Tafana silhavyi (Caporiacco, 1955), *T. chimire* sp. nov., *T. maracay* sp. nov., *T. arawak* sp. nov., *T. pettieri* sp. nov.

Tafana silhavyi (Caporiacco, 1955)
Figs 6E, 8A–B, G–K, 9A, C–D, 22–23, 33C, 34

Anyphaena silhavyi Caporiacco, 1955: 386, fig. 51a–b (type: male holotype from El Junquito, Venezuela, deposited in MUCV, examined).

Tafana silhavyi – Brescovit 1997: 90.

Diagnosis

Males of *Tafana silhavyi* resemble those of *T. chimirae* sp. nov., *T. maracay* sp. nov., *T. arawak* sp. nov. and *T. pettieri* sp. nov. by having the laminar apophysis at the base of the embolus, but differ by presenting a secondary looping with wide curvature (Figs 9A, 22C). Females resemble those of *T. maracay* sp. nov. and *T. arawak* sp. nov. by having the wide atrium, but differ by having the copulatory ducts extremely large in the anterior region (Figs 22F–G, 33C).

Material examined

Holotype

VENEZUELA • ♂; Federal District, El Junquito; [10°28'0" N, 67°5'00" W]; Marcuzzi leg.; MUCV 741.

Other material

VENEZUELA – Aragua • 2 ♂♂, 10 ♀♀; Colonia Tovar; [10°24'20" N, 67°17'22" W]; no date; E. Simon leg.; MNHN 11312 • 1 ♂, 1 ♀; same collection data as for preceding; IBSP 258184.

Description

Male (MNHN 11312)

COLOR. Exemplar probably discolored. Carapace orange with cephalic region dark (Fig. 22A). Labium,

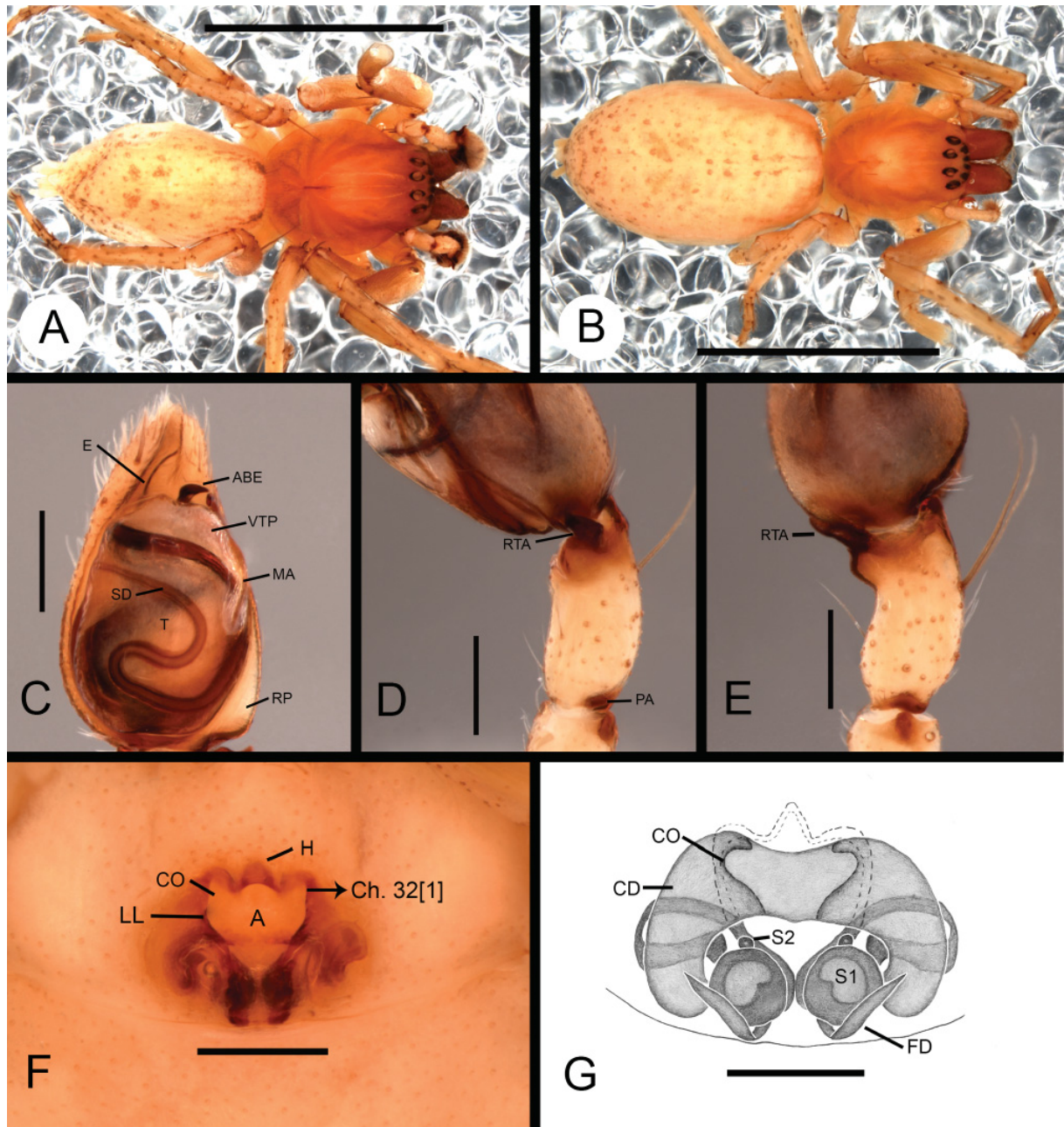


Fig. 22. *Tafana silhavyi* (Caporiacco, 1955) (A, C–E=♂, MNHN 11312; B, F–G=♀, MNHN 11312). A. Habitus, dorsal view. B. Habitus, dorsal view. C. Left palp, ventral view. D. Left palp, retrolateral view. E. Left palp, dorsal view. F. Epigynum, ventral view (arrow indicating character). G. Vulva, dorsal view. Abbreviations: A=atrium; ABE=apophysis of base of the embolus; CD=copulatory ducts; CO=copulatory opening; Ch=character; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; MA=median apophysis; PA=patellar apophysis; RP=retrolateral projection; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; SD=sperm duct; T=tegulum; VTP=ventral tegular process. Scale bars: A–B=2.16 mm; C–G=0.25 mm.

sternum and endites yellow. Chelicerae reddish. Legs I–IV yellow, darker at tarsi. Abdomen gray with dark spots (Fig. 22A).

MEASUREMENTS. Total length 4.2, carapace length 1.73, width 1.1. Clypeus height 0.06. Eye diameters and interdistances: AME 0.08, ALE 0.12, PME 0.1, PLE 0.1; AME–AME 0.02, AME–ALE 0.02, PME–PME 0.1, PME–PLE 0.06, ALE–PLE 0.04. Chelicerae 0.9 long, with four promarginal teeth and seven retromarginal denticles.

LEG MEASUREMENTS. I—femur 1.9/patella 0.7/tibia 2.1/metatarsus 1.8/tarsus 0.7/total 7.2; II—1.7/0.7/1.13/1.49/0.65/5.67; III—1.3/0.5/0.9/1.1/0.4/4.2; IV—1.9/0.7/1.5/1.9/0.5/6.5.

LEG SPINATION. I—tibia v2-2-2, p1-0-1, r1-0-1, metatarsus v2-0-0, p0-1-0, r0-1-0; II—tibia v2-2-2, p1-0-1, r1-0-1, metatarsus p0-1-0, r0-1-0; III—tibia v1-2-2, p1-1-0, r1-1-0; IV—tibia p1-1-1.

PALP. Retrolateral tibial apophysis short and curved; cymbium with retrolateral projection; projection at the base of the embolus laminar and coiled; embolus long, with large base and narrow apex; median apophysis long and curved apically; ventral tegular process hyaline and short; sperm duct an inverted ‘S-shape’ (Figs 22C–E, 23A–C).

ABDOMEN. Length 2.4, epigastric furrow 0.6 from tracheal spiracle, spiracle 1.2 from base of spinnerets.

Female (MNHN 11312)

COLOR. Exemplar probably discolored. Coloration as in males of this species (Fig. 22B).

MEASUREMENTS. Total length 4.4, carapace length 1.45, width 1.3. Clypeus height 0.04. Eye diameters and interdistances: AME 0.06, ALE 0.08, PME 0.06, PLE 0.08; AME–AME 0.02, AME–ALE 0.02, PME–PME 0.1, PME–PLE 0.04, ALE–PLE 0.04. Chelicerae 0.6 long, with four promarginal teeth and five retromarginal denticles.

LEG MEASUREMENTS. I—femur 1.3/patella 0.6/tibia 1.3/metatarsus 1.1/tarsus 0.5/total 4.8; II—1.2/0.6/1.13/1.0/0.5/4.43; III—1.0/0.4/0.7/0.9/0.4/3.4; IV—1.4/0.5/1.1/1.3/0.48/4.78.

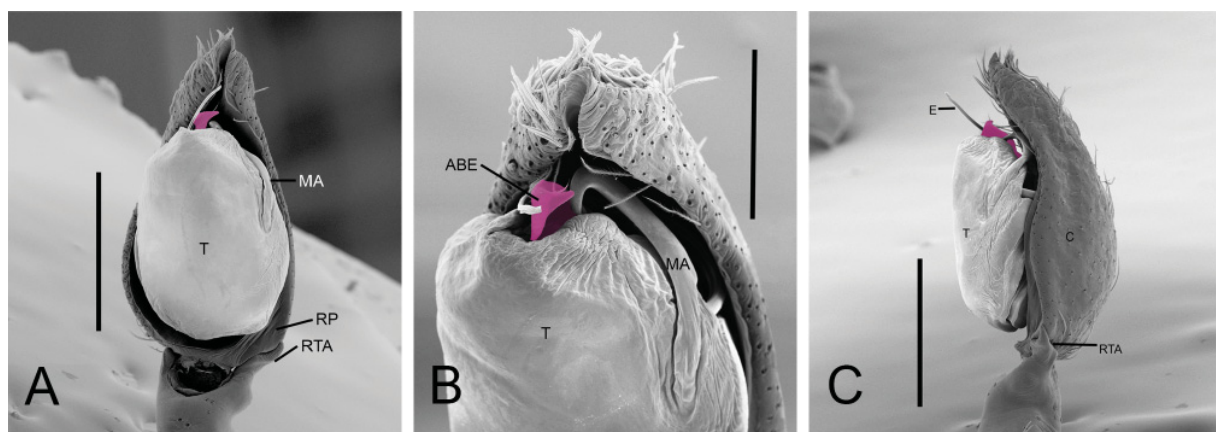


Fig. 23. *Tafana silhavyi* (Caporiacco, 1955), ♂ (MNHN 13312). **A.** Left palp, ventral view. **B.** Left palp, frontal view. **C.** Left palp, retrolateral view. Abbreviations: ABE = apophysis of base of the embolus; C = cymbium; E = embolus; MA = median apophysis; RP = retrolateral projection; RTA = retrolateral tibial apophysis; T = tegulum. Scale bars: A, C = 0.4 mm; B = 0.2 mm.

LEG SPINATION. I—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus v2-0-0, p1-0-0, r1-0-0; II—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus p1-0-0, r1-0-0; III—tibia v1-2-2, p1-1-0, r1-1-0, metatarsus v2-1-2; IV—tibia v1-2-2, r1-1-0, metatarsus v2-1-2.

EPIGYNUM. Hood triangular and sclerotized, connecting with lateral lobes; atrium large; epigynal plate covered by cuticle in the posterior region; lateral lobes sinuous. Internally, copulatory ducts large in the anterior region; primary spermathecae oval; secondary spermathecae small, above the primary spermathecae; fertilization ducts long (Figs 22F–G, 33C).

ABDOMEN. Length 2.9, epigastric furrow 0.8 from tracheal spiracle, spiracle 1.1 from base of spinnerets.

Variation

Two males: total length 4.1–4.4; carapace 1.83–1.9; femur I 1.7–1.9. Ten females: total length 4.0–6.2; carapace 1.6–2.3; femur I 1.3–1.9.

Distribution

Venezuela (Fig. 34).

Tafana chimire sp. nov.

urn:lsid:zoobank.org:act:E82DBA67-4582-40CE-878D-AB3F2B6C4351

Figs 24, 35

Diagnosis

Males of *Tafana chimire* sp. nov. resemble other males of the *silhavyi* group by the laminar base of the apophysis of the embolus, but differ from them by the base of the retrolateral tibial apophysis with a hook shape apically and the presence of a large basal prominent protuberance on the tegulum (Fig. 24C–E).

Etymology

The specific name is a noun in apposition taken from the name of the type locality, Chimire.

Material examined

Holotype

VENEZUELA • 1 ♂; Chimire; [9°11'49.2" N, 66°00'32.4" W]; Jun. 1975; Martinez leg.; MACN-Ar.

Description

Male (holotype, MACN-Ar)

COLOR. Exemplar probably discolored. Carapace orange with spots on the extremities (Fig. 24A). Labium, sternum and endites orange. Chelicerae reddish. Legs I–IV yellow, darker at tarsi. Abdomen yellow with dark spots (Fig. 24A–B).

MEASUREMENTS. Total length 3.8, carapace length 1.8, width 1.5. Clypeus height 0.04. Eye diameters and interdistances: AME 0.06, ALE 0.08, PME 0.08, PLE 0.08; AME–AME 0.02, AME–ALE 0.02, PME–PME 0.08, PME–PLE 0.04, ALE–PLE 0.02. Chelicerae 0.6 long, with four promarginal teeth and six retromarginal denticles.

LEG MEASUREMENTS. I—femur 1.1/patella 0.5/tibia 1.3/metatarsus 1.1/tarsus 0.5/total 4.5; II—0.9/0.5/1.2/1.0/0.5/4.1; III—0.75/0.4/0.72/0.8/0.0/2.67; IV—1.3/0.5/1.1/1.4/0.4/4.7.

LEG SPINATION. I—tibia v2-2-2, p1-0-1, r1-0-1, metatarsus v2-0-0, p0-1-0, r0-1-0; II—tibia v2-2-2, p1-0-1, r1-0-1, metatarsus p0-1-0, r0-1-0; III—tibia v1-2-2, p0-1-1, r0-1-1; IV—tibia p1-1-1.

PALP. Retrolateral tibial apophysis short; cymbium with basal retrolateral projection small; apophysis at the base of the embolus laminar and coiled; embolus long with large base and narrow apex; median apophysis long and curved apically; ventral tegular process hyaline apically in the bulb; sperm duct with secondary looping horizontal position (Fig. 24C–E).

ABDOMEN. Length 1.8, epigastric furrow 0.3 from tracheal spiracle, spiracle 0.8 from base of spinnerets.

Female

Unknown.

Distribution

Known only from Chimire, Venezuela (Fig. 35).

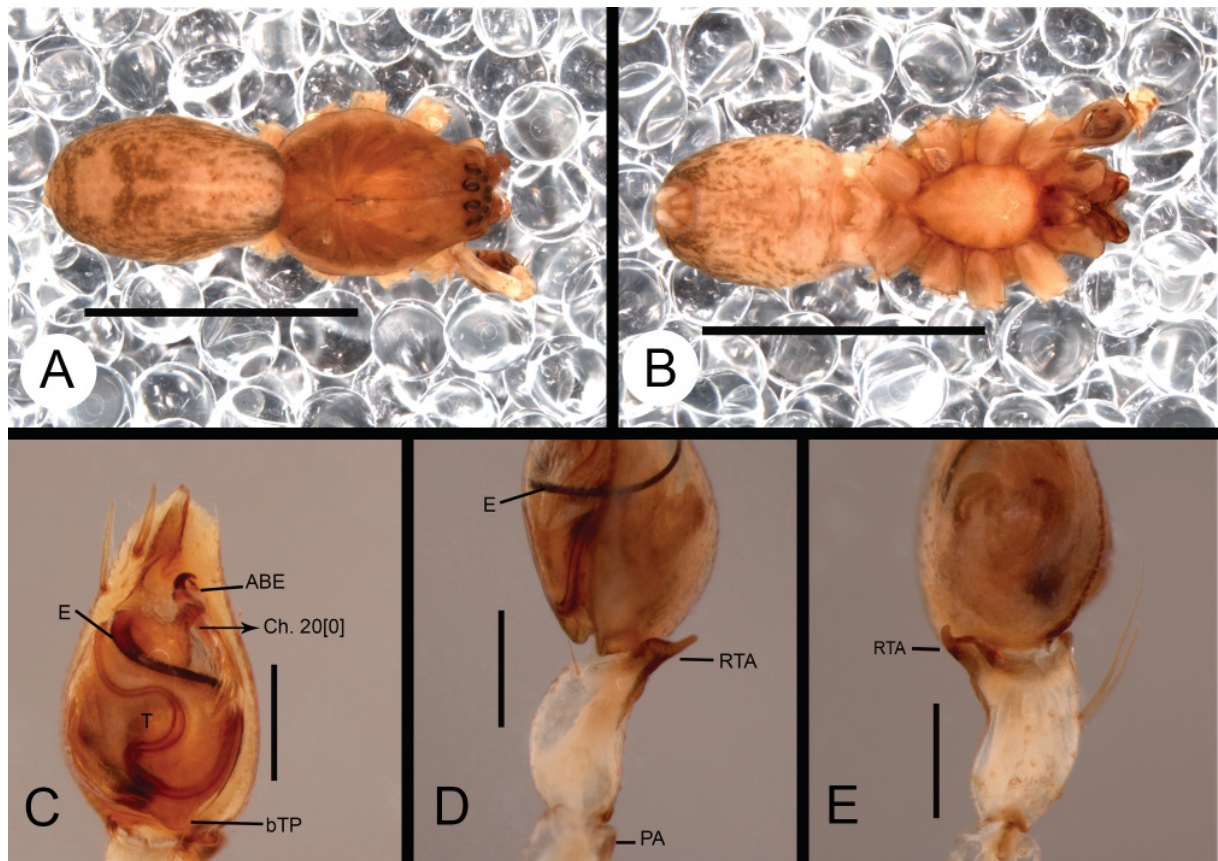


Fig. 24. *Tafana chimire* sp. nov. (MACN-Ar), ♂. **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Left palp, ventral view (arrow indicating character). **D.** Left palp, retrolateral view. **E.** Left palp, dorsal view. Abbreviations: ABE=apophysis of base of the embolus; bTP=basal tegular protuberance; Ch=character; E=embolus; PA=patellar apophysis; RTA=retrolateral tibial apophysis; T=tegulum. Scale bars: A–B=2.16 mm; C–E=0.25 mm.

***Tafana maracay* sp. nov.**

urn:lsid:zoobank.org:act:692C24F0-D9ED-4D1B-9831-129C603BB253

Figs 8C–F, 25–26, 33D, 34

Diagnosis

Males of *T. maracay* sp. nov. resemble those of the *silhavyi* group by having the apophysis at the base of the embolus laminar, but differ from the other species by having the retrolateral tibial apophysis short, curved apically and presenting a basal projection rounded (Figs 25C–E, 26C). Females resemble those of *T. silhavyi* and *T. arawak* sp. nov. by having the epigynal plate with a wide atrium, but differ by having the copulatory ducts slightly narrowing in the anterior region (Figs 25F–G, 33D).

Etymology

The specific name is a noun in apposition taken from the type locality Maracay, currently the capital of the State of Aragua in Venezuela.

Material examined

Holotype

VENEZUELA • 1 ♂; Aragua, Colonia Tovar; [10°24'20" N, 67°17'22" W]; E. Simon leg.; MNHN 11319.

Paratypes

VENEZUELA • 1 ♀; same collection data as for holotype; MNHN 11319 • 1 ♂, 1 ♀; same collection data as for holotype; IBSP 209871.

Other material

VENEZUELA – Aragua • 1 ♂, 2 ♀♀; same collection data as for holotype; MNHN 11314.

Description

Male (holotype, MNHN 11319)

COLOR. Exemplar probably discolored. Carapace orange with cephalic region dark (Fig. 25A). Labium, sternum and endites yellow. Chelicerae reddish. Legs I–IV yellow, darkest at tarsi. Abdomen yellow with dark spots in dorsal view (Fig. 25A).

MEASUREMENTS. Total length 4.7, carapace length 2.1, width 1.8. Clypeus height 0.04. Eye diameters and interdistances: AME 0.08, ALE 0.1, PME 0.1, PLE 0.1; AME–AME 0.02, AME–ALE 0.02, PME–PME 0.1, PME–PLE 0.04, ALE–PLE 0.02. Chelicerae 0.6 long, with four promarginal teeth and five retromarginal denticles.

LEG MEASUREMENTS. I—femur 2.0/patella 0.9/tibia 2.2/metatarsus 1.83/tarsus 0.9/total 7.83; II—1.9/0.7/1.8/1.8/0.5/6.7; III—1.2/0.6/1.0/1.1/0.4/4.3; IV—1.7/0.6/1.4/1.8/0.49/5.99.

LEG SPINATION. I—tibia v2-2-2, p0-1-1, r1-1-0, metatarsus v2-0-0, p0-1-0, r0-1-0; II—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus p0-1-0, r0-1-0; III—tibia p1-1-1, r1-1-1; IV—tibia p1-1-1.

PALP. Retrolateral tibial apophysis short, extremely curved at the apex; cymbium with basal retrolateral projection; apophysis at the base of the embolus laminar and coiled; embolus long with large base and narrow apex; median apophysis long and curved apically; ventral tegular process short and hyaline; subtegulum hardly visible; sperm duct with primary looping large (Figs 25C–E, 26A–C).

ABDOMEN. Length 2.6, epigastric furrow 0.6 from tracheal spiracle, spiracle 1.2 from base of spinnerets.

Female (paratype, MNHN 11319)

COLOR. Exemplar probably discolored. Coloration as in males of this species (Fig. 25B).

MEASUREMENTS. Total length 6.6, carapace length 2.5, width 1.95. Clypeus height 0.06. Eye diameters and interdistances: AME 0.08, ALE 0.12, PME 0.1, PLE 0.1; AME–AME 0.02, AME–ALE 0.02, PME–

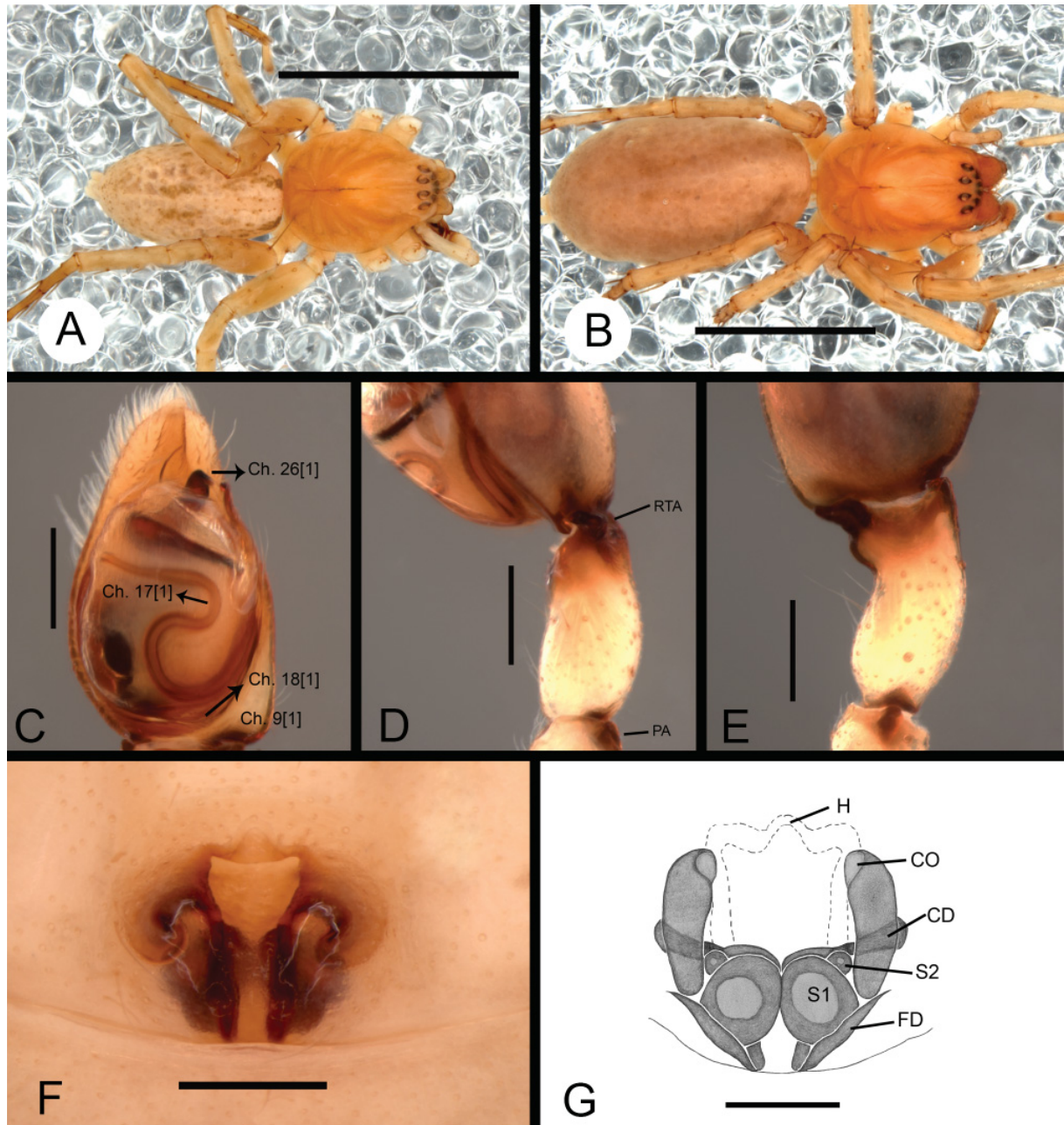


Fig. 25. *Tafana maracay* sp. nov. (A, C–E = ♂, MNHN 11314; B, F–G = ♀, MNHN 11314). **A.** Habitus, dorsal view. **B.** Habitus, dorsal view. **C.** Left palp, ventral view (arrow indicating character). **D.** Left palp, retrolateral view. **E.** Left palp, dorsal view. **F.** Epigynum, ventral view. **G.** Vulva, dorsal view. Abbreviations: CD=copulatory ducts; Ch=character; CO=copulatory opening; FD=fertilization ducts; H=hood; PA=patellar apophysis; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae. Scale bars: A=2.16 mm; B=3.5 mm; C–G=0.25 mm.

PME 0.14, PME–PLE 0.1, ALE–PLE 0.04. Chelicerae 1.0 long, with four promarginal teeth and five retromarginal denticles.

LEG MEASUREMENTS. I—femur 1.8/patella 0.9/tibia 1.8/metatarsus 1.5/tarsus 0.8/total 6.8; II—1.8/0.9/1.6/1.4/0.7/6.4; III—1.5/0.8/1.0/1.22/0.4/4.22; IV—2.0/0.9/1.6/2.2/0.6/7.3.

LEG SPINATION. I—tibia v2-2-2, p1-1-1, r0-1-0, metatarsus v2-0-0, p0-1-0, r0-1-0; II—tibia v2-2-2, p1-1-1, r0-1-0, metatarsus p0-1-0, r0-1-0; III—tibia p1-1-0, r1-1-0; IV—tibia r1-1-0.

EPIGYNUM. Hood triangular and connecting to the lateral lobes; wide atrium; epigynal plate covered by cuticle in the posterior region; lateral lobes sinuous. Internally, copulatory ducts slightly narrow in the anterior region; primary spermathecae oval; secondary spermathecae large, above primary spermathecae; fertilization ducts long (Figs 25F–G, 26D–E, 33D).

ABDOMEN. Length 4.0, epigastric furrow 1.0 from tracheal spiracle, spiracle 1.7 from base of spinnerets.

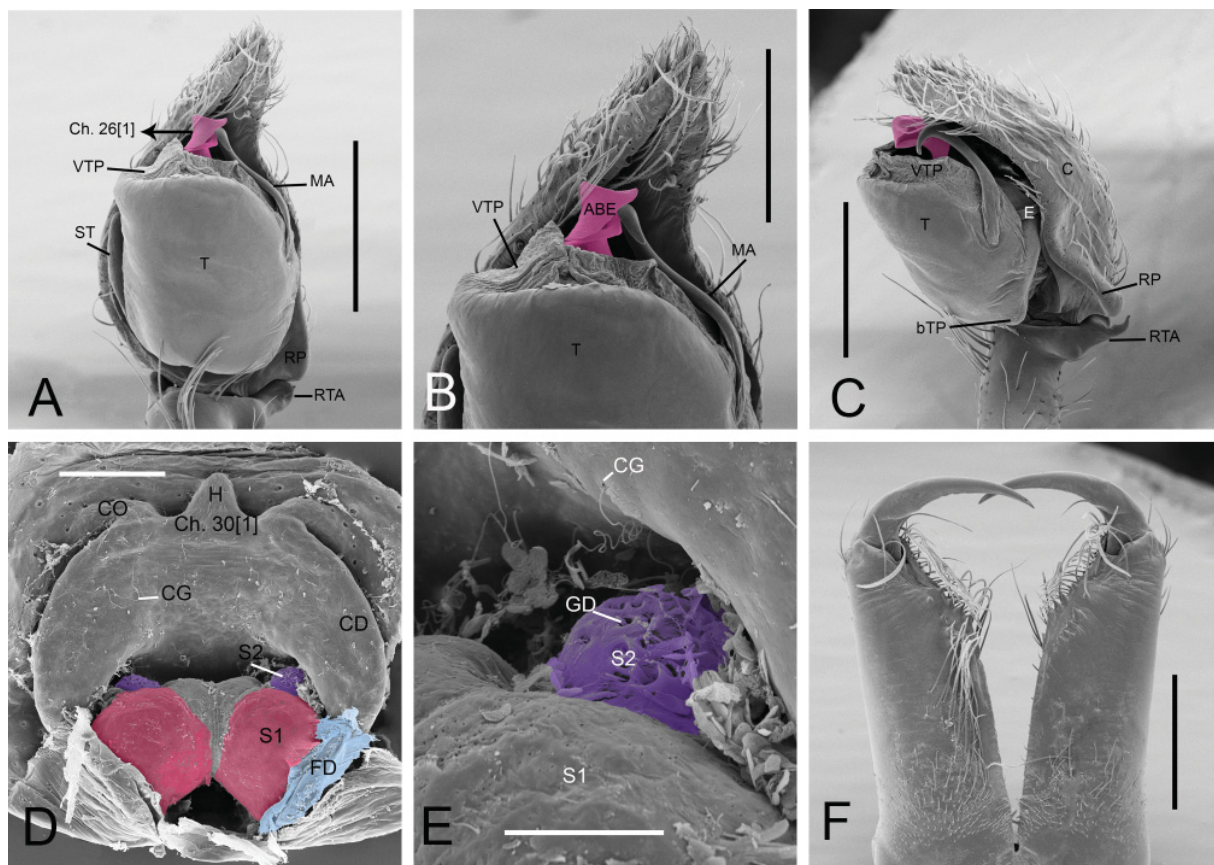


Fig. 26. *Tafana maracay* sp. nov. (A–C, F = ♂, MNHN 11314; D–E = ♀, MNHN 11314). **A.** Left palp, ventral view (arrow indicating character). **B.** Left palp, ventral view. **C.** Left palp, retrolateral view. **D.** Vulva, dorsal view. **E.** Vulva, dorsal view, details of spermathecae. **F.** Chelicerae, ventral view. Abbreviations: ABE=apophysis of base of the embolus; bTP=basal tegular protuberance; C=cymbium; CD=copulatory ducts; CG=cuticular glands; Ch=character; CO=copulatory opening; E=embolus; FD=fertilization ducts; GD=gland ducts; H=hood; MA=median apophysis; RP=retrolateral projection; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; ST=subtegulum; T=tegulum; VTP=ventral tegular process. Scale bars: A, C, F=0.5 mm; B=0.3 mm; D=0.1 mm; E=0.03 mm.

Variation

Three males: total length 4.1–5.3; carapace 1.8–2.4; femur I 1.9–2.5. Four females: total length 4.3–6.6; carapace 1.7–2.3; femur I 1.3–2.0.

Distribution

Venezuela (Fig. 34).

Tafana arawak sp. nov.

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Figs 27, 33E, 35

Diagnosis

Males of *Tafana arawak* sp. nov. resemble others of the *silhavyi* group by a laminar and coiled apophysis at the base of the embolus, but differ by the retrolateral tibial apophysis bifid (Fig. 27C–E). Females resemble those of *T. silhavyi* and *T. maracay* sp. nov. by the epigynal plate with wide atrium, but differ by the atrium extremely wide and the large hood (Figs 27F–G, 33E).

Etymology

The specific name is derived from the Brazilian Portuguese word ‘Aruaques’ (in Spanish ‘Arahuaco’) for the name of an indigenous group from the Americas, named ‘Arawak’, meaning ‘flour eater’. The name should be treated as a noun in apposition.

Material examined

Holotype

VENEZUELA • 1 ♂; Aragua, Colonia Tovar; [10°24'20" N, 67°17'22" W]; no date; E. Simon leg.; MNHN 11320.

Paratype

VENEZUELA • 1 ♀; same collection data as for holotype; MNHN 11320.

Description

Male (holotype, MNHN 11320)

COLOR. Exemplar probably discolored. Carapace orange with cephalic region dark (Fig. 27A). Labium, sternum and endites yellow. Chelicerae reddish. Legs I–IV yellow, darkest at tarsi. Abdomen yellow with spots in dorsal view (Fig. 27A).

MEASUREMENTS. Total length 6.1, carapace length 2.7, width 2.2. Clypeus height 0.08. Eye diameters and interdistances: AME 0.08, ALE 0.12, PME 0.1, PLE 0.12; AME–AME 0.04, AME–ALE 0.02, PME–PME 0.12, PME–PLE 0.06, ALE–PLE 0.04. Chelicerae 1.0 long, with four promarginal teeth and four retromarginal denticles.

LEG MEASUREMENTS. I—femur 3.1/patella 1.1/tibia 3.8/metatarsus 3.27/tarsus 1.3/total 12.57; II—2.8/1.1/3.1/2.8/1.1/10.9; III—2.0/0.8/1.2/2.0/0.6/6.6; IV—2.8/0.75/2.6/3.2/0.8/10.15.

LEG SPINATION. I—tibia v2-2-2, p1-1-1, r1-1-1, metatarsus v2-0-0, p0-1-0, r0-1-0; II—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus p0-1-0, r0-1-0; III—tibia v2-2-2, p1-1-0, r1-1-0; IV—tibia p1-1-0.

PALP. Retrolateral tibial apophysis bifid with anterior branch truncated and posterior branch thin; cymbium with retrolateral projection; apophysis at the base of the embolus laminar and coiled; embolus

long with large base and narrow apex; median apophysis long and curved apically; ventral tegular process long and hyaline; basal protuberance of the tegulum short; sperm duct with secondary looping in oblique position in the tegulum (Fig. 27C–E).

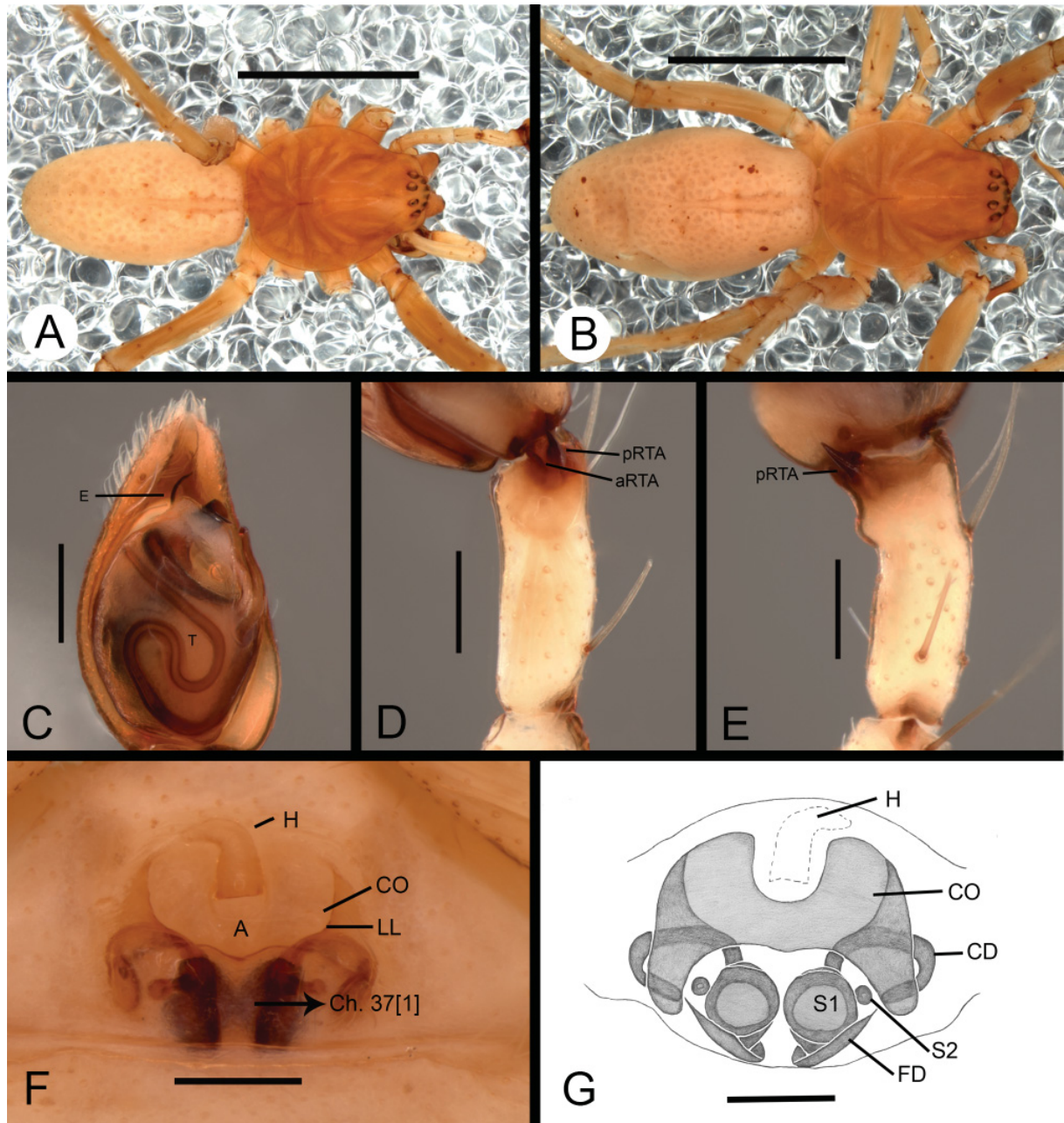


Fig. 27. *Tafana arawak* sp. nov. (A, C–E=holotype, ♂, MNHN 11320; B, F–G=paratype, ♀, MNHN 11320). **A.** Habitus, dorsal view. **B.** Habitus, dorsal view. **C.** Left palp, ventral view. **D.** Left palp, retrolateral view. **E.** Left palp, dorsal view. **F.** Epigynum, ventral view (arrow indicating character). **G.** Vulva, dorsal view. Abbreviations: A=atrium; aRTA=anterior branch of the retrolateral tibial apophysis; CD=copulatory ducts; CO=copulatory opening; Ch=character; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; pRTA=posterior branch of the retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum. Scale bars: A–B=3.5 mm; C–G=0.25 mm.

ABDOMEN. Length 3.2, epigastric furrow 0.63 from tracheal spiracle, spiracle 1.6 from base of spinnerets.

Female (paratype, MNHN 11320)

COLOR. Exemplar probably discolored. Coloration as in males of this species (Fig. 27B).

MEASUREMENTS. Total length 7.1, carapace length 2.9, width 2.2. Clypeus height 0.06. Eye diameters and interdistances: AME 0.08, ALE 0.1, PME 0.1, PLE 0.12; AME–AME 0.02, AME–ALE 0.02, PME–PME 0.14, PME–PLE 0.08, ALE–PLE 0.04. Chelicerae 1.0 long, with four promarginal teeth and six retromarginal denticles.

LEG MEASUREMENTS. I—femur 2.9/patella 1.1/tibia 3.2/metatarsus 2.59/tarsus 1.1/total 10.89; II—2.6/1.0/2.75/2.3/1.0/9.65; III—2.0/0.8/1.5/1.7/0.6/6.6; IV—2.8/0.82/2.5/3.1/0.75/9.97.

LEG SPINATION. I—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus v2-0-0, p0-1-0, r0-1-0; II—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus p0-1-0, r0-1-0; III—tibia p1-1-0, r1-1-0; IV—tibia r1-1-0.

EPIGYNUM. Hood triangular; wide atrium; epigynal plate covered with hyaline cuticle in the posterior region; lateral lobes sinuous. Internally, copulatory ducts extremely large in the anterior region; primary spermathecae oval and separated; secondary spermathecae small, lateral of the primary spermathecae, and fertilization ducts longer than the primary spermathecae (Figs 27F–G, 33E).

ABDOMEN. Length 4.0, epigastric furrow 0.8 from tracheal spiracle, spiracle 2.2 from base of spinnerets.

Distribution

Venezuela (Fig. 35).

Tafana pittieri sp. nov.

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Figs 28, 33F, 35

Diagnosis

Males of *Tafana pittieri* sp. nov. resemble those of the *silhavyi* group by having the secondary looping in the middle in the tegulum, but differ from them by having the large laminar, ring-shaped apophysis at the base of the embolus and retrolateral tibial apophysis short and truncated (Fig. 28C–E). Females differ from the other species by having the lateral lobes wing-shaped in the median region, covering part of the atrium, and secondary spermathecae with slender shape (Fig. 28F–G, 33F).

Etymology

The specific name is a patronym in honor of Henri Pittier, a botanist, geographer and ethnologist who devoted himself to the study of the flora and fauna in the National Park Henri Pittier, where the specimen was collected. In the year of 1953 the park (until then called Rancho Grande) was renamed in honor of H. Pittier.

Material examined

Holotype

VENEZUELA • 1 ♂; Aragua, Rancho Grande, current National Park Henri Pittier; [10°20'58" N, 67°41'08" W]; 8–15 Apr. 1945; M. Beebe *et. al.* leg.; AMNH.

Paratype

VENEZUELA • 1 ♀; same collection data as for holotype; AMNH.

Description

Male (holotype, AMNH)

COLOR. Exemplar probably discolored. Carapace orange with cephalic region dark (Fig. 28A). Labium, sternum and endites yellow. Chelicerae reddish. Legs I–IV yellow, darkest at tarsi. Abdomen yellow with spots in dorsal view (Fig. 28A).

MEASUREMENTS. Total length 6.3, carapace length 2.8, width 2.21. Clypeus height 0.08. Eye diameters and interdistances: AME 0.1, ALE 0.12, PME 0.1, PLE 0.12; AME–AME 0.04, AME–ALE 0.04, PME–PME 0.12, PME–PLE 0.1, ALE–PLE 0.04. Chelicerae 1.1 long, with four promarginal teeth and four retromarginal denticles.

LEG MEASUREMENTS. I—femur 3.0/patella 1.1/tibia 3.5/metatarsus 3.12/tarsus 1.2/total 11.92; II—2.7/1.1/2.4/2.8/0.93/9.93; III—1.98/0.8/1.53/2.0/0.6/6.91; IV—2.7/0.9/2.5/3.1/0.7/9.9.

LEG SPINATION. I—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus v2-0-0, p1-0-0, r1-0-0; II—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus p1-0-0, r1-0-0; III—tibia p1-1-1, r1-1-1; IV—tibia p1-1-1.

PALP. Cymbium with large retrolateral projection, embolus long with large base and narrow apex; median apophysis long and curved apically; ventral tegular process short and hyaline; tegulum without basal protuberance; sperm duct with secondary looping in horizontal position; median apophysis laminar, long and curved at the apex (Fig. 28C–E).

ABDOMEN. Length 3.4, epigastric furrow 0.5 from tracheal spiracle, spiracle 1.9 from base of spinnerets.

Female (paratype, AMNH)

COLOR. Exemplar probably discolored. Coloration as in males of this species, except for chelicerae reddish brown (Fig. 28B).

MEASUREMENTS. Total length 5.4, carapace length 2.2, width 1.8. Clypeus height 0.06. Eye diameters and interdistances: AME 0.08, ALE 0.1, PME 0.1, PLE 0.1; AME–AME 0.04, AME–ALE 0.02, PME–PME 0.14, PME–PLE 0.08, ALE–PLE 0.04. Chelicerae 2.2 long, with four promarginal teeth and four retromarginal denticles.

LEG MEASUREMENTS. I—femur 1.9/patella 0.8/tibia 1.8/metatarsus 1.6/tarsus 0.8/total 6.9; II—1.5/0.6/1.05/1.4/0.6/5.15; III—1.2/0.5/0.7/1.1/0.4/3.9; IV—1.7/0.7/1.6/2.0/0.52/6.52.

LEG SPINATION. I—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus v2-0-0, p1-0-0, r1-0-0; II—tibia v2-2-2, p0-1-0, r1-1-0, metatarsus p1-0-0, r1-0-1; III—tibia v1-2-2, p1-1-0, r1-1-0, metatarsus v2-1-2, p0-1-1, r0-1-1; IV—tibia v1-2-2, p1-1-1.

EPIGYNUM. Triangular hood with sclerotized border; atrium short; epigynal plate not covered by cuticle, covered in the posterior region; lateral lobes sinuous with wing form in the median region. Internally, copulatory ducts short and curved; primary spermathecae oval and separated; secondary spermathecae small in the posterior region of the copulatory ducts; fertilization ducts longer than primary spermathecae (Figs 28F–G, 33F).

ABDOMEN. Length 3.2, epigastric furrow 0.6 from tracheal spiracle, spiracle 1.1 from base of spinnerets.

Distribution

Known only from Aragua, Venezuela (Fig. 33).

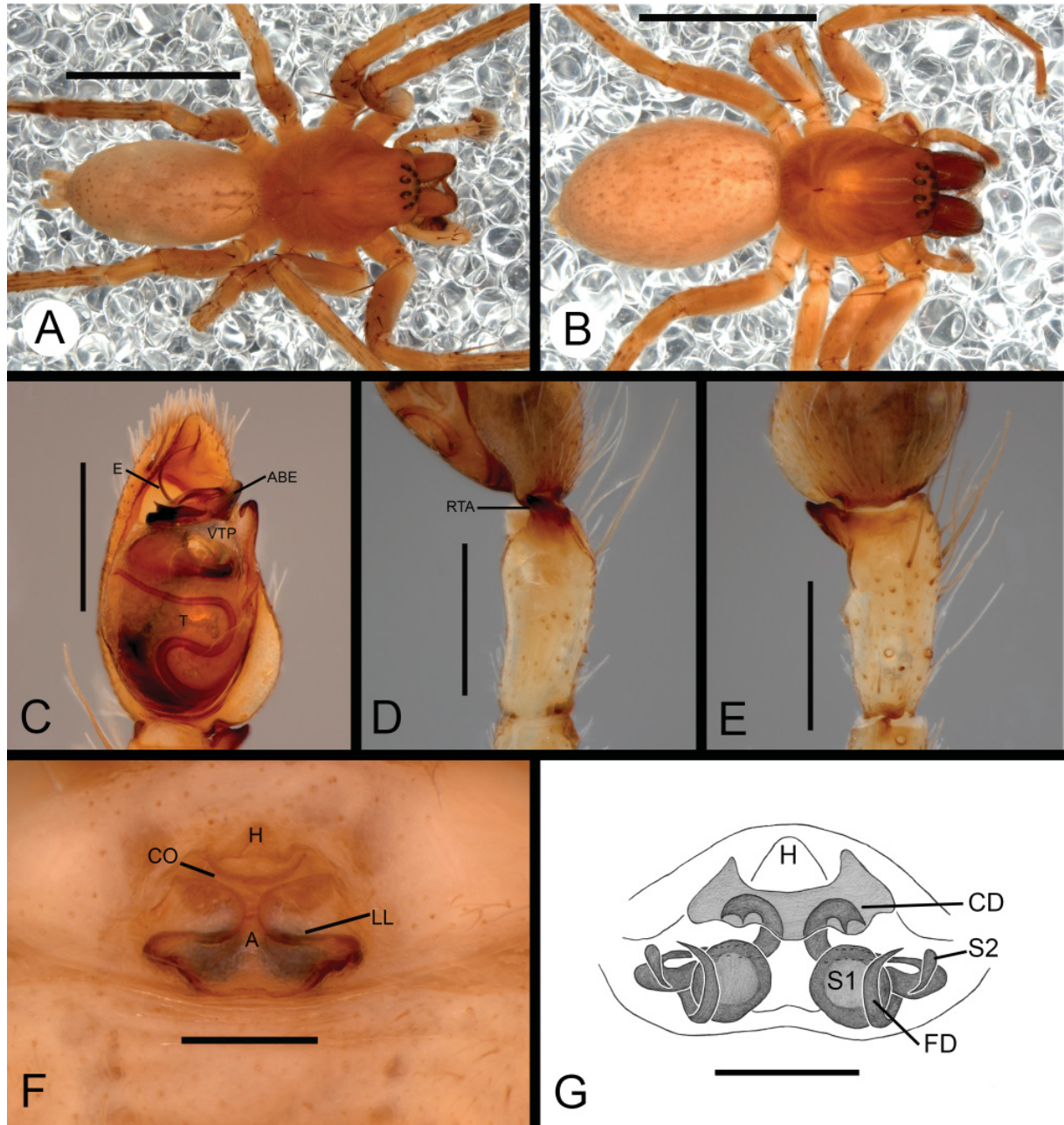


Fig. 28. *Tafana pittieri* sp. nov. (A, C–E=holotype, ♂, AMNH; B, F–G=paratype, ♀, AMNH). A. Habitus, dorsal view. B. Habitus, dorsal view. C. Left palp, ventral view. D. Left palp, retrolateral view. E. Left palp, dorsal view. F. Epigynum, ventral view. G. Vulva, dorsal view. Abbreviations: A=atrium; ABE=apophysis of base of the embolus; CD=copulatory ducts; CO=copulatory opening; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum; VTP=ventral tegular process. Scale bars: A–B=3.5 mm; C–D=0.4 mm; F–G=0.25 mm.

Tafana oliviae sp. nov.

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Figs 29, 33G, 35

Diagnosis

Males of *Tafana oliviae* sp. nov. differ from those of the other species in the *silhavyi* group by having the apophysis at the base of the embolus finger-shaped, retrolateral tibial apophysis bifid with anterior branch short and flattened, posterior branch triangular and median tibial apophysis bifid in dorsal position on the tibia (Fig. 29C–E). Females differ by having the epigynal plate with lateral lobes extremely projected to the sides and by having the small primary spermathecae (Figs 29F–G, 33G).

Etymology

The specific name is a matronymic in memory of Olivia de Moura Oliveira, the first author's mother.

Material examined

Holotype

ARGENTINA • 1 ♂; Misiones, Santa María; [27°56'04" S, 55°24'25" W]; Nov–Dec. 1913; M.J. Viana leg.; MACN-Ar 3565.

Paratype

ARGENTINA • 1 ♀; Misiones, Cataratas del Iguazú, near the Puerto Iguazú; [25°41'43" S, 54°26'12" W]; Nov. 1970; M.E. Galiano leg.; MCZ.

Remark

The male and female were matched by their close localities in Misiones, Argentina. Despite the different colorations of the male and female, the morphology of the genitalia suggests that both exemplars belong to *Tafana oliviae* sp. nov.

Description

Male (holotype, MACN-Ar 3565)

COLOR. Exemplar probably discolored. Carapace orange, darker in cephalic region (Fig. 29A). Labium, sternum and endites yellow. Chelicerae reddish. Legs I–IV yellow. Abdomen yellow with lateral dark spots and a yellow spot in the middle (Fig. 29A).

MEASUREMENTS. Total length 3.9, carapace length 1.7, width 1.4. Clypeus height 0.04. Eye diameters and interdistances: AME 0.06, ALE 0.08, PME 0.08, PLE 0.06; AME–AME 0.02, AME–ALE 0.04, PME–PME 0.1, PME–PLE 0.06, ALE–PLE 0.02. Chelicerae 1.0 long, with four promarginal teeth and six retromarginal denticles.

LEG MEASUREMENTS. I—femur 2.1/patella 0.7/tibia 2.5/metatarsus 2.2/tarsus 1.1/total 8.6; II—1.6/0.5/1.7/1.5/0.7/6.0; III—1.3/0.6/0.9/1.2/0.4/4.4; IV—2.0/0.6/1.3/2.1/0.6/6.6.

LEG SPINATION. I—tibia v2-2-0, metatarsus v2-0-1; II—tibia v1-2-0; III—tibia v1-1-0, p1-1-0, r1-1-0, metatarsus v2-1-2, r1-0-1; IV—tibia v0-1-1, p1-1-1, r1-1-0.

PALP. Retrolateral tibial apophysis bifid; cymbium without retrolateral projection; embolus short and bifurcate at the apex; median apophysis long and curved apically; sperm duct with secondary looping reaching the apex of the tegulum (Fig. 29C–E).

ABDOMEN. Length 2.1, epigastric furrow 0.6 from tracheal spiracle, spiracle 1.0 from base of spinnerets.

Female (paratype, MCZ)

COLOR. Exemplar probably discolored. Coloration as in males of this species except for legs yellow, darker at tarsi. Abdomen yellow (Fig. 29B).

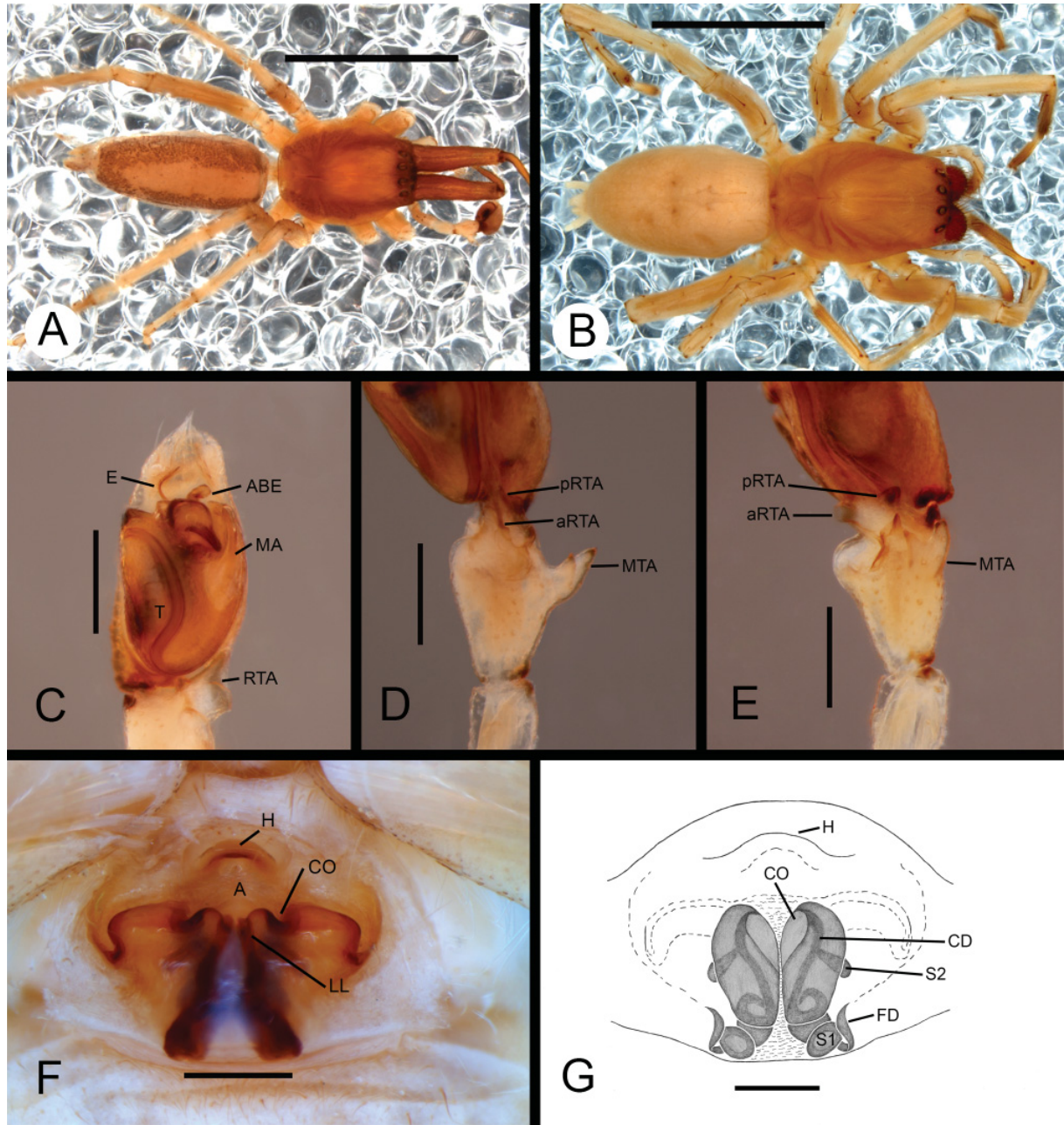


Fig. 29. *Tafana oliviae* sp. nov. (A, C–E=holotype, ♂, MACN-Ar 3565; B, F–G=paratype, ♀, MCZ). A. Habitus, dorsal view. B. Habitus, dorsal view. C. Left palp, ventral view. D. Left palp, retrolateral view. E. Left palp, retrolateral view. F. Epigynum, ventral view. G. Vulva, dorsal view. Abbreviations: A=atrium; ABE=apophysis of base of the embolus; aRTA=anterior branch of the retrolateral tibial apophysis; CD=copulatory ducts; CO=copulatory opening; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; MA=median apophysis; MTA=median tibial apophysis; pRTA=posterior branch of the retrolateral tibial apophysis; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; T=tegulum. Scale bars: A–B=3.5 mm; C–G=0.25 mm.

MEASUREMENTS. Total length 5.7, carapace length 2.7, width 1.8. Clypeus height 0.04. Eye diameters and interdistances: AME 0.08, ALE 0.08, PME 0.1, PLE 0.1; AME–AME 0.08, AME–ALE 0.08, PME–PME 0.18, PME–PLE 0.16, ALE–PLE 0.04. Chelicerae 1.1 long, with four promarginal teeth and four retromarginal denticles.

LEG MEASUREMENTS. I—femur 2.0/patella 0.9/tibia 1.8/metatarsus 1.4/tarsus 0.8/total 6.9; II—1.9/0.9/1.1/1.3/0.63/5.83; III—1.5/0.72/1.1/1.23/0.5/5.05; IV—2.25/0.8/1.72/2.1/0.7/7.57.

LEG SPINATION. I—tibia v2-2-0, metatarsus v2-0-0; II—tibia v2-2-0; III—tibia v1-1-2, p0-0-1, r0-0-1, metatarsus v2-1-2; IV—tibia v1-1-2, p1-1-1.

EPIGYNUM. Hood semicircular and thick; lateral lobes curved in anterior region; wide atrium; epigynal plate covered by cuticle in the posterior region. Internally, copulatory ducts long and narrow; secondary spermathecae in the anterior region of the copulatory ducts; primary spermathecae small and fertilization ducts longer than primary spermathecae (Figs 29F–G, 33G).

ABDOMEN. Length 2.9, epigastric furrow 0.7 from tracheal spiracle, spiracle 1.4 from base of spinnerets.

Distribution

Known only from Misiones, Argentina (Fig. 35).

Tafana orinoco sp. nov.

urn:lsid:zoobank.org:act:34463201-9F72-43FF-886B-A9EFCE74C526

Figs 30–31, 33H, 34

Diagnosis

Males of *Tafana orinoco* sp. nov. resemble those of *T. pastaza* sp. nov. by having the shape of the apophysis at the base of the embolus bifid, but differ by the primary apophysis conical and curved in the apex and secondary apophysis furrowed, median tibial apophysis short and triangular in retrolateral position (Figs 30C–E, 31A–C). Females differ from those of the other species in the *silhavyi* group by having quadrangular atrium and copulatory ducts extremely large and short in anterior region of the vulva (Figs 30G, 33H).

Etymology

The specific name, a noun in apposition, is a tribute to ‘River Orinoco’, one of the most important rivers of the South American continent.

Material examined

Holotype

VENEZUELA • 1 ♂; Mawaca, Federal Territory of Amazonas; 84 km SE of La Esmeralda; [3°10′22.73″ N, 65°32′32.39″ W]; 5 Mar. 1985; J. Latke and R. Candia leg.; MIZA 07062.

Paratype

VENEZUELA • 1 ♀; same collection data as for holotype; MIZA 07062.

Other material

VENEZUELA – **Amazonas Division** • 1 ♂; Federal Territory of Amazonas, Cerro de La Neblina; [00°53′11″ N, 65°59′22″ W]; 12 Feb. 1985; W.E. Steiner leg.; USNM • 1 ♂, 1 ♀; Mawaca, Central, Federal Territory of Amazonas; [3°10′22.73″ N, 65°32′32.39″ W]; 5 Mar. 1985; J. Latke and R. Candia leg.; MIZA 07062.

Description

Male (holotype, MIZA 07062)

COLOR. Exemplar probably discolored. Carapace reddish brown (Fig. 30A). Labium, sternum and endites

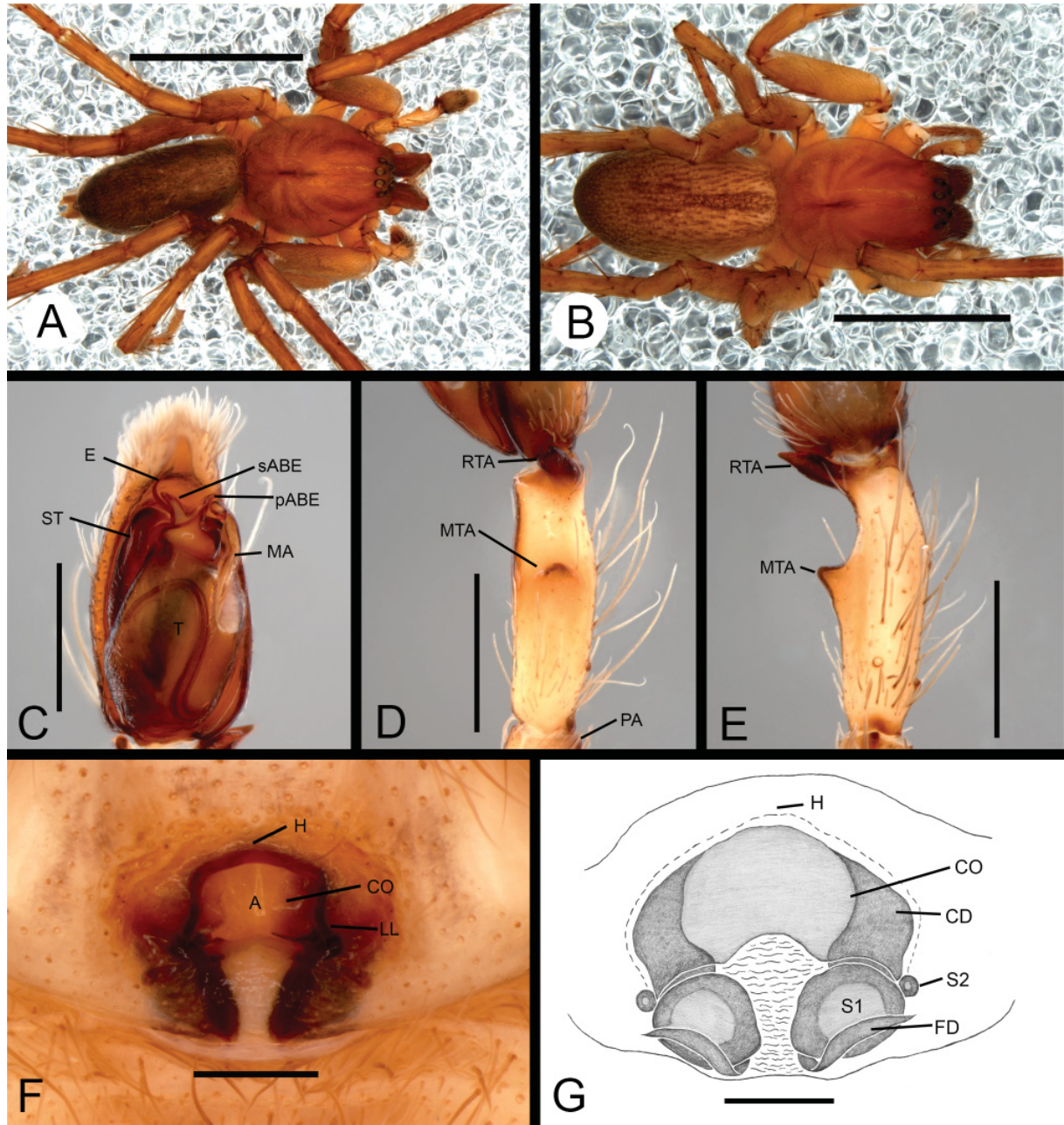


Fig. 30. *Tafana orinoco* sp. nov. (A, C–E = holotype, ♂, MIZA 07062; B, F–G = paratype, ♀, MIZA 07062). A. Habitus, dorsal view. B. Habitus, dorsal view. C. Left palp, ventral view. D. Left palp, retrolateral view. E. Left palp, dorsal view. F. Epigynum, ventral view. G. Vulva, dorsal view. Abbreviations: A=atrium; CD=copulatory ducts; CO=copulatory opening; E=embolus; FD=fertilization ducts; H=hood; LL=lateral lobes; MA=median apophysis; MTA=median tibial apophysis; PA=patellar apophysis; ABE=primary apophysis of base of the embolus; RTA=retrolateral tibial apophysis; S1=primary spermathecae; S2=secondary spermathecae; sABE=secondary apophysis of base of the embolus; ST=subtegulum; T=tegulum. Scale bars: A–B=3.5 mm; C=0.5 mm; D–E=0.66 mm; F–G=0.25 mm.

reddish brown. Chelicerae reddish. Legs I–IV reddish with spots on the articles. Abdomen with dark spots (Fig. 30A).

MEASUREMENTS. Total length 7.9, carapace length 3.7, width 3.0. Clypeus height 0.1. Eye diameters and interdistances: AME 0.12, ALE 0.18, PME 0.16, PLE 0.16; AME–AME 0.04, AME–ALE 0.02, PME–PME 0.1, PME–PLE 0.08, ALE–PLE 0.02. Chelicerae 1.5 long, with four promarginal teeth and seven retromarginal denticles.

LEG MEASUREMENTS. I—femur 4.0/patella 1.6/tibia 4.2/metatarsus 3.9/tarsus 1.9/total 15.6; II—3.9/1.59/3.8/3.6/1.5/14.39; III—3.2/1.4/2.5/3.1/1.09/11.29; IV—4.1/1.5/3.6/4.5/1.3/15.0.

LEG SPINATION. I—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus v2-0-0, p0-1-0, r0-1-0; II—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus p0-1-0, r0-1-0; III—tibia p1-1-1, r1-1-1; IV—tibia p1-1-1.

PALP. Retrolateral tibial apophysis short and curved; cymbium without retrolateral projection; apophysis at the base of the embolus bifid with secondary apophysis furrowed; embolus short; median apophysis long and curved apically; sperm duct with secondary looping not reaching the apex of the tegulum; subtegulum strongly projected; ventral tegular process inconspicuous (Figs 30C–E, 31A–C).

ABDOMEN. Length 4.1, epigastric furrow 1.0 from tracheal spiracle, spiracle 2.0 from base of spinnerets.

Female (paratype, MIZA 07062)

COLOR. Coloration as in males of this species (Fig. 30B).

MEASUREMENTS. Total length 7.5, carapace 3.4, width 2.6. Clypeus height 0.1. Eye diameters and interdistances: AME 0.12, ALE 0.14, PME 0.14, PLE 0.12; AME–AME 0.02, AME–ALE 0.02, PME–PME 0.18, PME–PLE 0.12, ALE–PLE 0.04. Chelicerae 1.6 long, with four promarginal teeth and five retromarginal denticles.

LEG MEASUREMENTS. I—femur 3.1/patella 1.4/tibia 3.22/metatarsus 2.9/tarsus 1.1/total 11.72; II—3.1/1.2/3.0/2.72/1.1/11.12; III—2.1/1.1/1.6/2.2/0.73/7.73; IV—3.3/1.24/2.9/3.3/0.84/11.58.

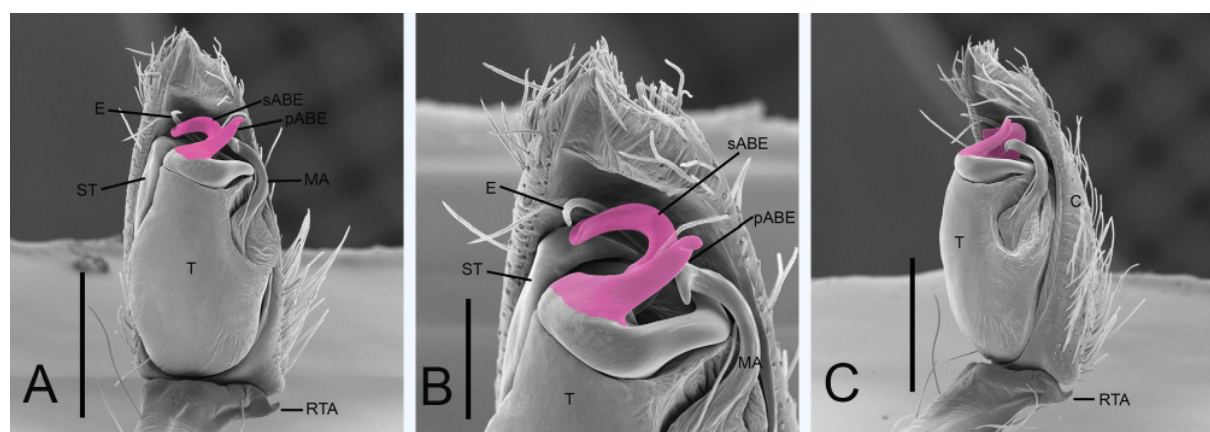


Fig. 31. *Tafana orinoco* sp. nov., ♂ (MIZA 07062). **A.** Left palp, ventral view. **B.** Left palp, ventral view. **C.** Left palp, retrolateral view. Abbreviations: C=cymbium; E=embolus; MA=median apophysis; pABE=primary apophysis of base of the embolus; RTA=retrolateral tibial apophysis; sABE=secondary apophysis of base of the embolus; ST=subtegulum; T=tegulum. Scale bars: A, C=0.5 mm; B=0.2 mm.

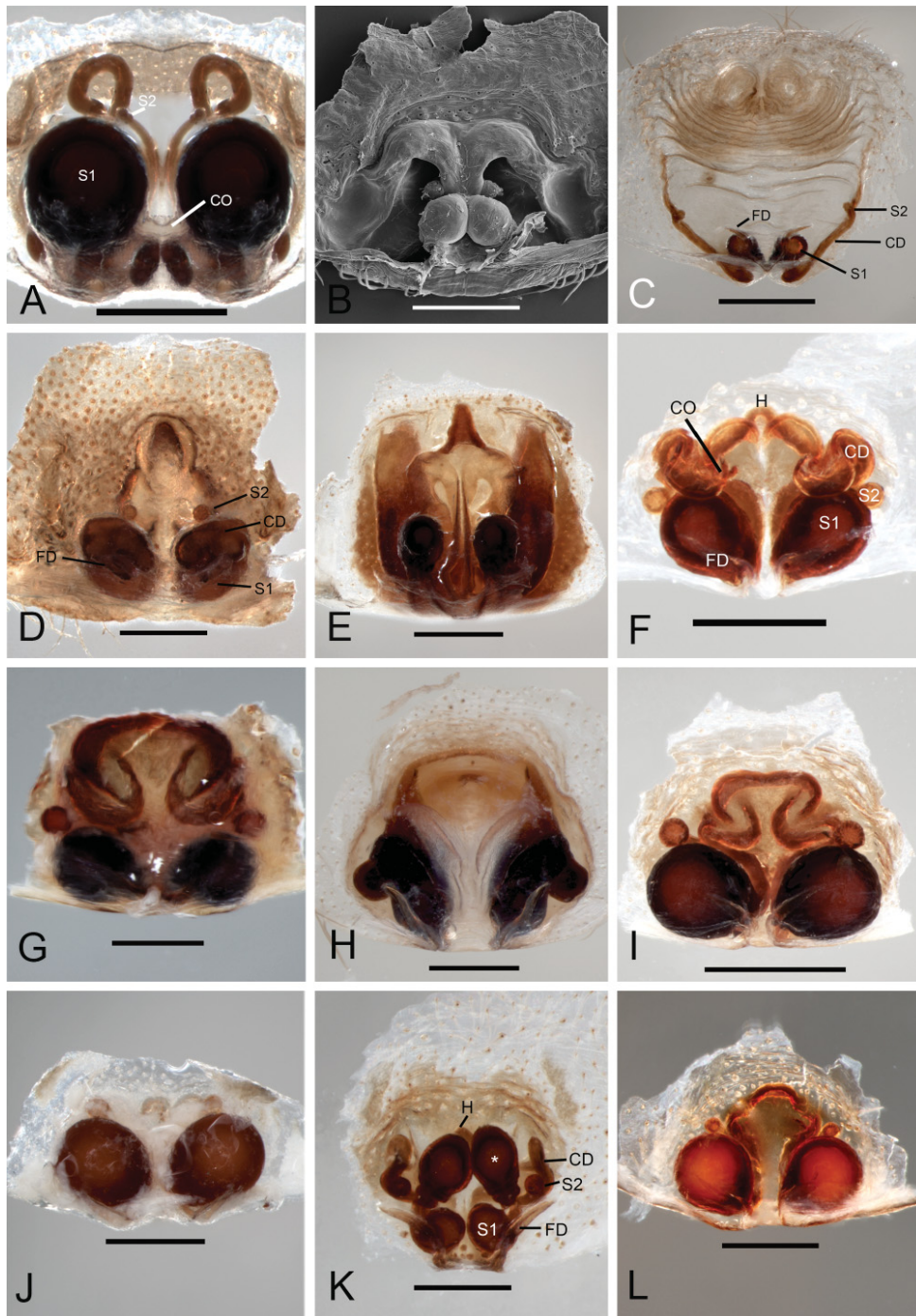


Fig. 32. Female genitalia, digested. **A.** *Arachosia praesignis* (Keyserling, 1891) (Amaurobioidinae) (IBSP 87975). **B.** *Xiruana gracilipes* (Keyserling, 1891) (Anyphaeninae) (IBSP 166120). **C.** *Aysha prospera* Keyserling, 1891 (IBSP 19783). **D.** *Anyphaena accentuata* (Walckenaer, 1802) (MCN). **E.** *Patrera fulvastra* Simon, 1903 (MCN 24208). **F.** *Tafana riveti* Simon, 1903 (MCZ). **G.** *Tafana straminea* (L. Koch, 1866) (AMNH). **H.** *Tafana quelchi* (Pocock, 1895) (IBSP 32131). **I.** *Tafana kunturmarqa* sp. nov. (ICN-Ar). **J.** *Tafana humahuaca* sp. nov. (MACN-Ar 41788). **K.** *Tafana pastaza* sp. nov. (AMNH). **L.** *Tafana nevada* sp. nov. (AMNH). Abbreviations: CD=copulatory ducts; CO=copulatory opening; FD=fertilization ducts; H=hood; S1=primary spermathecae; S2=secondary spermathecae. Asterisks to globose membranous extension of proximal copulatory ducts. Scale bars: A–B, D–I, K–L=0.25 mm; C=0.3 mm; J=0.5 mm.

LEG SPINATION. I—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus v2-0-0, p0-1-0, r0-1-0; II—tibia v2-2-2, p1-1-0, r1-1-0, metatarsus p0-1-0, r0-1-0; III—tibia p1-1-1, r1-1-1; IV—tibia p1-1-1.

EPIGYNUM. Hood narrow and rounded, connected to the lateral lobes; wide atrium; epigynal plate not covered by hyaline cuticle in the posterior region; sinuous and narrow lateral lobes. Internally, copulatory

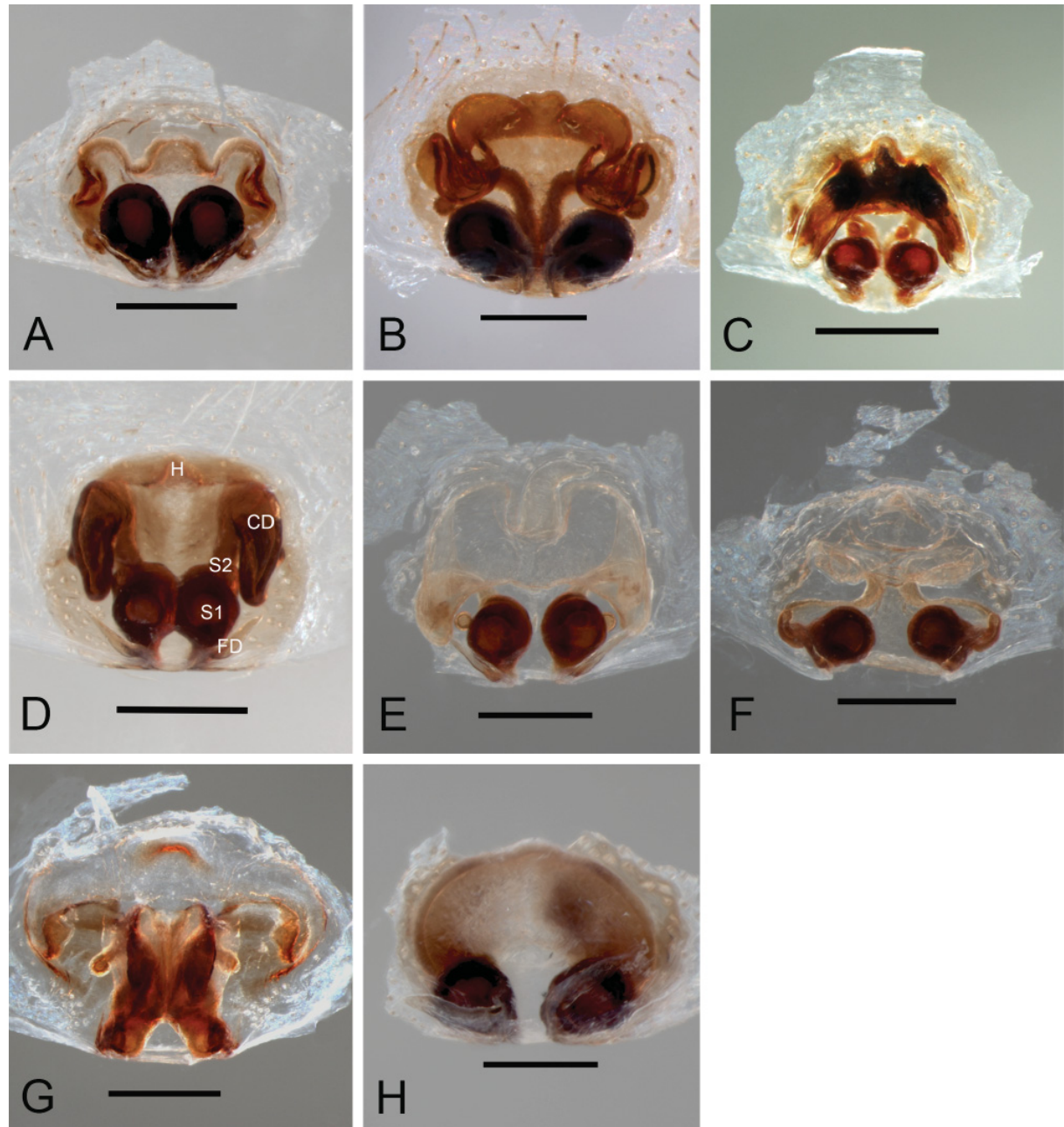


Fig. 33. Female genitalia, digested. **A.** *Tafana huatanay* sp. nov. (MUSM). **B.** *Tafana ruizi* sp. nov. (IBSP 258183). **C.** *Tafana silhavyi* (Caporiacco, 1955) (MNHN). **D.** *Tafana maracay* sp. nov. (MNHN 11314). **E.** *Tafana arawak* sp. nov. (MNHN 11320). **F.** *Tafana pittieri* sp. nov. (AMNH). **G.** *Tafana oliviae* sp. nov. (MCZ). **H.** *Tafana orinoco* sp. nov. (MIZA 07062). Abbreviations: CD=copulatory ducts; FD=fertilization ducts; H=hood; S1=primary spermathecae; S2=secondary spermathecae. Scale bars: A–H=0.25 mm.

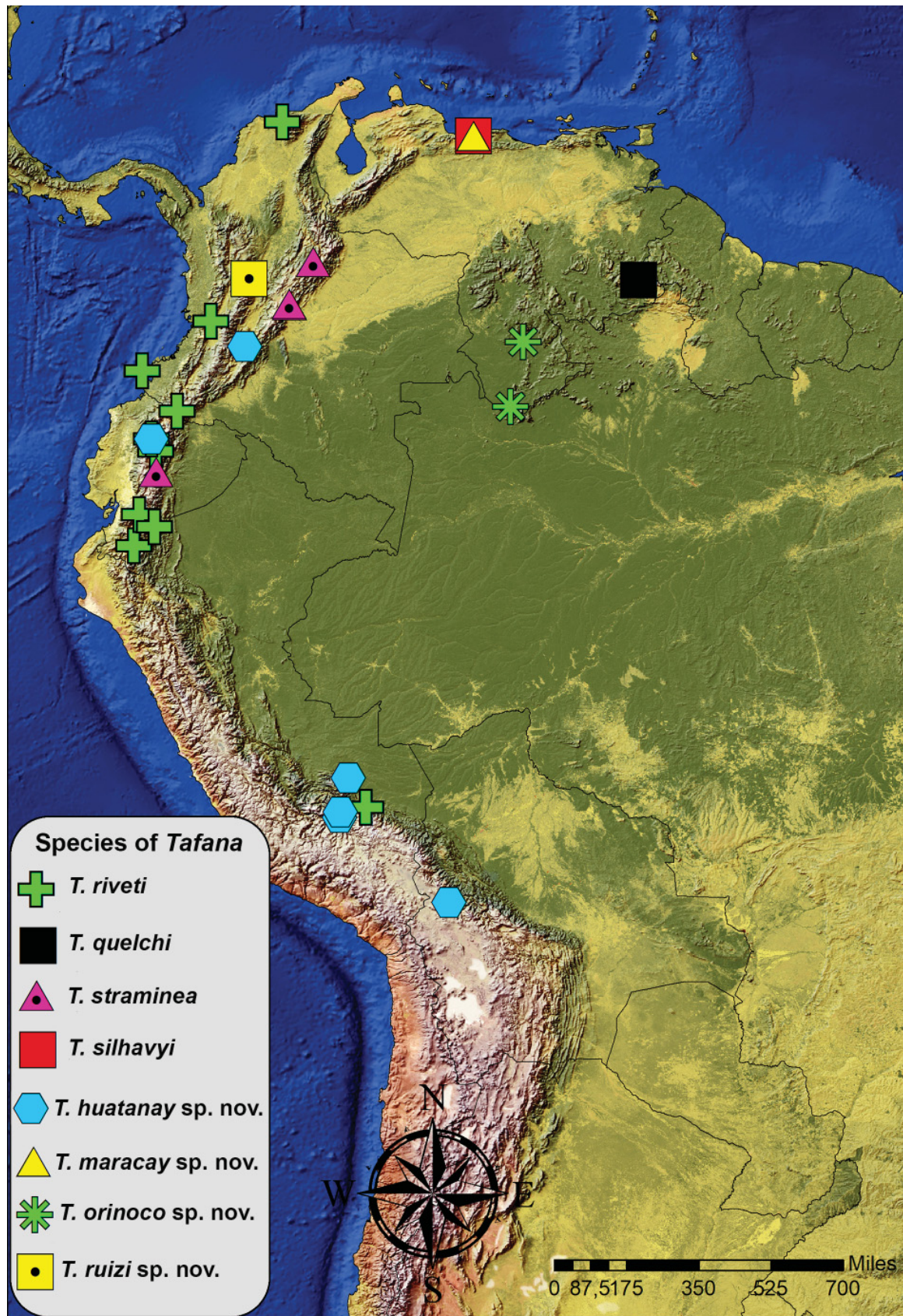


Fig. 34. Distribution map of species of *Tafana*.

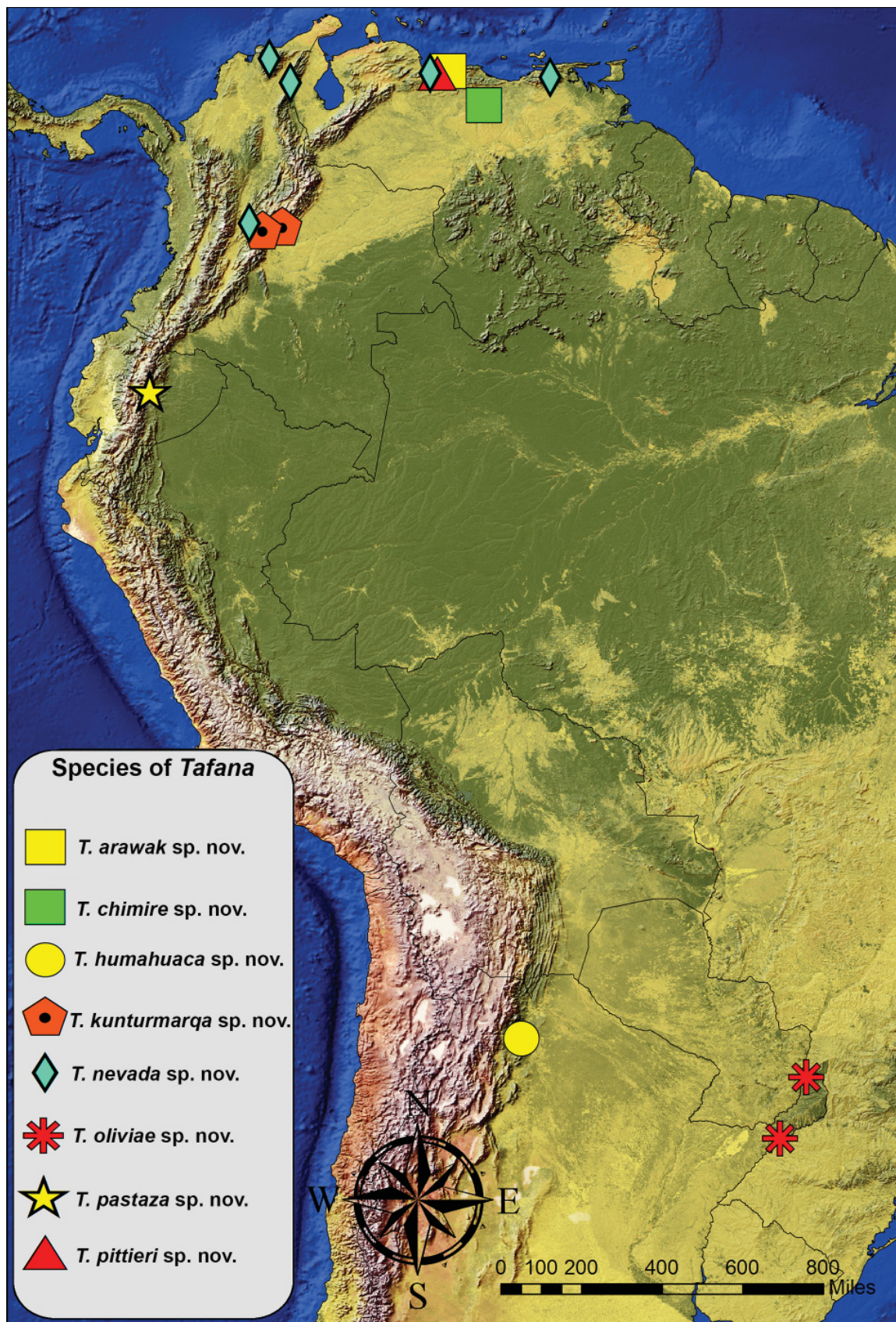


Fig. 35. Distribution map of species of *Tafana*.

ducts large and short; secondary spermathecae above the primary spermathecae; primary spermathecae separated; fertilization ducts long, superimposed on the primary spermathecae (Figs 30F–G, 33H).

ABDOMEN. Length 4.0, epigastric furrow 0.5 from tracheal spiracle, spiracle 2.1 from base of spinnerets.

Distribution

Known only from Venezuela (Fig. 34).

Discussion

The genus *Tafana* is predominantly distributed along the northern and western edges of South America, with some species associated with high elevation regions of the Andes mountain range (Figs 34–35). *Tafana oliviae* sp. nov., the sister species of all *Tafana*, occurs in the lowland regions of Misiones, Argentina. The next species to diverge from the main clade, *Tafana orinoco* sp. nov., occurs in both lowland and high elevation areas like Cerro de La Neblina at 1690 m a.s.l. in Venezuela. One of the major species groups of *Tafana*, the *silhavyi* group, includes species that occur in lowland regions of far northern Venezuela. The other, the *riveti* group, includes species endemic to the Andean region (*T. riveti*, *T. straminea*, *T. huatanay* sp. nov., *T. nevada* sp. nov.), with those species generally occurring at elevations from 800 to 3600 m, as well as species from the Amazonian region (*T. quelchi* and *T. pastaza* sp. nov.). *Tafana humahuaca* sp. nov., also in this group, occurs in the Argentinian region of Jujuy, at altitudes from 1259 to 4000 m. To fully understand the distributional patterns of the genus, inclusion of more species and a biogeographical analysis are needed.

The monophyly of the genus *Tafana* is strongly supported, although the internal branches have low support values for several monophyletic groups (Figs 3–4). Our results and topology are corroborated by other works based on morphological data (Ramírez 1995b; Izquierdo & Ramírez 2008; Werenkraut & Ramírez 2009; Soto & Ramírez 2012; Cabra-García & Brescovit 2016). In addition, our results recovered the close relationship of *Aysha* and *Xiruana*, based on the features of the embolic process in the male bulb copulatory. The close relationship of these species is also found in other works (Brescovit 1997; Ramírez 2003, 2007; Labarque *et al.* 2015).

Evolution of morphological characters

Median tibial apophysis

In *Tafana*, the median tibial apophysis has a triangular shape as, e.g., in *T. orinoco* sp. nov. (Fig. 30D–E). This shape is shared by other Anyphaeninae groups such as *Xiruana gracilipes* (see Oliveira & Brescovit 2015a: 205, fig. 2d–f). In *Aysha prospera*, it is long and keel-shaped (Fig. 6I), whereas in *T. oliviae* sp. nov. (Fig. 29D–E), it is bilobed and positioned on the dorsal region of the tibia.

Embolic process

In a genus-level taxonomic review, Brescovit (1997: 118) suggested that *Tafana* belonged to the “*Aysha* group”, supported by the putative synapomorphy of the embolic process on the apical region of the copulatory bulb in males. The *Aysha* group is composed of ten genera: *Umuara* Brescovit, 1997; *Aysha* Keyserling, 1891; *Xiruana* Keyserling, 1891; *Osoriella* Mello-Leitão, 1922; *Hibana* Brescovit, 1991; *Aljassa* Brescovit, 1997; *Pippuhana* Brescovit, 1997; *Hatitia* Brescovit, 1997; *Temnida* Simon, 1896 and *Tafana* Simon, 1903. Our analysis recovered the *Aysha* group as monophyletic; however, the inclusion of more genera is further needed to confirm the existence of this group. In our analysis, this process is conical in both *Xiruana gracilipes* and *Tafana*, and is ring-shaped in *Aysha prospera* (Brescovit 1992b: 79; 1997: 79, figs 8–11).

Apophysis at the base of the embolus

After revising the genus-level taxonomy, we found that all known species are diagnosed by the presence of an apophysis at the base of the embolus (Figs 18A–C, 23A–C, 31A–C). This character is shared by all species of *Tafana*, but it is not restricted to this genus. Some species of Anyphaeninae, such as *Xiruana tetraseta* (see Oliveira & Brescovit 2015a: 209, fig. 5a–b), which were not included in this analysis, also have this structure. In the phylogeny of the genus presented here, *T. orinoco* sp. nov. and *T. pastaza* sp. nov. present a bilobed apophysis at the base of the embolus, and in *T. orinoco* sp. nov. the secondary apophysis (Fig. 31B–C) has a furrow, which we suggest may function as a conductor. In the *silhavyi* group, species only have one apophysis, with a laminar shape, while in the *riveti* group, species also have one apophysis, generally with a conical shape (except in *T. pastaza* sp. nov.).

Cymbium, retrolateral projection

Another character that is not limited to *Tafana* is the retrolateral projection on the cymbium (Figs 10C, 12A, 22C, 26A, C). The absence of this character is plesiomorphic for *Tafana* and the structure is absent in *T. oliviae* sp. nov., *T. orinoco* sp. nov. and *T. quelchi*, although it is present in all other species in the genus. Some other genera of the Anyphaeninae also present some retrolateral projection on the cymbium, as in the genera *Katissa* Brescovit, 1997 and *Osoriella* Mello-Leitão, 1922. For these genera, the retrolateral projection is restricted to the basal region of the cymbium (Brescovit 1997: 180, fig. 270). Apparently, this retrolateral projection is associated with a repose of the retrolateral tibial apophysis in the cymbium and would likely not be homologous to the paracymbium of others families, but deeper analysis would be necessary to test this (Platnick & Gertsch 1976; Coddington 1990; Griswold *et al.* 1998).

Ventral tegular process

The genus was originally diagnosed by Brescovit (1997: 88) based on sexual characters such as a distal ventral tegular process. The ventral tegular process (Figs 6J, 10C, 12B, 22C, 26A–B) is present in most Anyphaeninae, and changes position on the copulatory bulb. In *Xiruana gracilipes* and *Anyphaena accentuata*, it is located on the apical portion of the copulatory bulb. The *silhavyi* group also shares this apical position. Yet, the position of the ventral tegular process near the median apophysis (Figs 9B, 10C, 12B–C, 18B–C) is present in the *riveti* group (Clade G) and could be homologous to the one found, for example, in the genus *Umuara* (see Oliveira & Brescovit 2015b: 438, fig. 2a–c).

Hood

The hood of the epigynum (Figs 7D, 10F, 22F, 32E–F, 33D–E) supports *Anyphaena accentuata* and *Patrera fulvastra* as the first lineages to diverge in Anyphaeninae. Although *Anyphaena* and *Patrera* are not part of the *Aysa* group, as they do not have an embolic process on the male copulatory bulb, the anterior region of the epigyne, however, is provided with a hood. This was mentioned by Brescovit (1997: 119), who stated that the hood in the female genitalia is not restricted to the *Aysa* group, but is also present in the genera *Anyphaena* and *Patrera*. This character is plesiomorphic in *Tafana* and may be homologous to the anterior pouch of the median field present in many Amaurobioidinae such as *Monapia* Simon, 1897, *Gayenna* Nicolet, 1849 and *Oxysoma* Nicolet, 1849 (Ramírez 1995a: 92, figs 18–20; 1999: 423, figs 4–5; 2003: 21; Ramírez *et al.* 2004: 6, figs 6–7).

Lateral lobes, shape

The shape of the lateral lobes is difficult to standardize in the Anyphaeninae, because they have a great variation in female genitalia (Brescovit 1997). However, all species of *Tafana* are united by having a sinuous shape of the lateral lobes (Figs 10F, 11F, 15F, 27F), while in *Anyphaena accentuata*, *Patrera fulvastra* and *Aysa prospera* the shape is straight (Fig. 7D), and in *Xiruana gracilipes* the lateral lobes are curved (Fig. 7E).

We agree that secondary and primary spermathecae are homologous in all species included in this analysis, as according to Ramírez (2014).

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References

- Azevedo G.H.F., Griswold C.E. & Santos A.J. 2018. Systematics and evolution of ground spiders revisited (Araneae, Dionycha, Gnaphosidae). *Cladistics* 34: 579–626. <https://doi.org/10.1111/cla.12226>
- Berland L. 1913. Araignées. In: *Service géographique de l'Armée. Mission du Service géographique de l'Armée pour la mesure d'un arc du méridien équatorial en Amérique du Sud (1899–1906)* 10: 78–119. Gauthier-Villars, Paris. <https://doi.org/10.5962/bhl.title.980>
- Bonaldo A.B. 2000. Taxonomia da subfamília Corinninae (Araneae, Corinnidae) nas regiões Neotropical e Neártica. *Iheringia* 89: 3–148.
- Bonnet P. 1955. *Bibliographia araneorum. Analyse méthodique de toute la littérature aranéologique jusqu'en 1939. Tome II. Systématique des araignées (Étude par ordre alphabétique) [1^e partie: A-B]*: 1–918. Douladoure, Toulouse.
- Bonnet P. 1959. *Bibliographia araneorum. Analyse méthodique de toute la littérature aranéologique jusqu'en 1939. Tome II. Systématique des araignées (Étude par ordre alphabétique) (5^e partie: T-Z)*: 4231–5058. Douladoure, Toulouse.
- Brescovit A.D. 1991a. Revalidação do gênero *Isigonia* Simon, com descrição de uma espécie nova (Araneae, Anyphaenidae). *Revista Brasileira de Entomologia* 35 (4): 721–727.
- Brescovit A.D. 1991b. *Hibana*, novo gênero de aranhas da família Anyphaenidae (Arachnida, Araneae). *Revista Brasileira de Entomologia* 35 (4): 729–744.
- Brescovit A.D. 1992a. Revisão das aranhas do gênero *Macrophyes* O. Pickard-Cambridge, da região Neotropical (Araneae, Anyphaenidae). *Revista Brasileira de Entomologia* 36 101–106.
- Brescovit A.D. 1992b. Revisão do grupo *prospera* do gênero *Aysa* Keyserling, 1891 na região Neotropical (Araneae, Anyphaenidae). *Iheringia Série Zoológica*: 72: 23–104.
- Brescovit A.D. 1993a. Novas espécies do gênero *Macrophyes* O.P.-Cambridge da região Neotropical (Araneae, Anyphaenidae). *Iheringia* 75: 113–116.
- Brescovit A.D. 1993b. *Thaloe* e *Bromelina*, novos gêneros de aranhas neotropicais da família Anyphaenidae (Arachnida, Araneae). *Revista Brasileira de Entomologia* 37: 693–703.
- Brescovit A.D. 1997. Revisão de Anyphaeninae Bertkau a nível de gêneros na região Neotropical (Araneae, Anyphaenidae). *Revista Brasileira de Zoologia* 13: 1–187. <https://doi.org/10.1590/S0101-81751996000500001>

- Brescovit A.D. 1999. Revisão das aranhas do gênero *Lupettiana* Brescovit (Araneae, Anyphaenidae, Anyphaeninae). *Revista Brasileira de Zoologia* 16: 63–76.
<https://doi.org/10.1590/S0101-81751999000600008>
- Brescovit A.D. & Oliveira L.F.M. 2019. Three new species of *Thaloe* Brescovit (Araneae: Anyphaenidae, Anyphaeninae), with descriptions of the first known females of the genus. *Zootaxa* 4624 (2): 256–266.
<https://doi.org/10.11646/zootaxa.4624.2.8>
- Bremer K. 1988. The limits of amino acid sequence data in angiosperm phylogenetic reconstruction. *Evolution* 42: 795–803.
- Bremer K. 1994. Branch support and tree stability. *Cladistics* 10: 295–304.
- Cabra-García J. & Brescovit A.D. 2016. Revision and phylogenetic analysis of the orb-weaving spider genus *Glenognatha* Simon, 1887 (Araneae, Tetragnathidae). *Zootaxa* 4069 (1): 1–183.
<https://doi.org/10.11646/zootaxa.4069.1.1>
- Caporiacco L. Di. 1955. Estudios sobre los aracnidos de Venezuela 2ª parte: Araneae. *Acta biologica Venezuelica* 1 (16): 245–448.
- Ceccarelli F.S., Opell B.D., Haddad C.R., Raven R.J., Soto E.M. & Ramírez M.J. 2016. Around the world in eight million years: historical biogeography and evolution of the spray zone spider *Amaurobioides* (Araneae: Anyphaenidae). *PLoS One* 11 (10): e0163740.
<https://doi.org/10.1371/journal.pone.0163740>
- Ceccarelli F.S., Koch M.N., Soto E.M., Barone M.L., Arnedo M.A. & Ramírez M.J. 2019. The grass was greener: repeated evolution of specialized morphologies and habitat shifts in ghost spiders following grassland expansion in South America. *Systematics Biology* 68 (1): 63–77.
<https://doi.org/10.1093/sysbio/syy028>
- Coddington J.A. 1990. Ontogeny and homology in the male palpus of orb-weaving spiders and their relatives, with comments on phylogeny (Araneoclada: Araneoidea, Deinopoidea). *Smithsonian Contributions to Zoology* 496: 1–52.
- Dupérré N. & Tapia E. 2016. Overview of the Anyphaenids (Araneae, Anyphaeninae, Anyphaenidae) spider fauna from the Chocó forest of Ecuador, with the description of thirteen new species. *European Journal of Taxonomy* 255: 1–50. <https://doi.org/10.5852/ejt.2016.255>
- Fitch W.M. 1971. Toward defining the course of evolution: minimum change for a specific tree topology. *Systematic Zoology* 20 (4): 404–416.
- Goodman M., Olson C.B., Beeber J.E. & Czelusniak J. 1982. New perspectives in the molecular biological analysis of mammalian phylogeny. *Acta Zoologica Fennica* 169: 19–35.
- Goloboff P.A. 2008. Calculating SPR distances between trees. *Cladistics* 24: 591–597.
- Goloboff P.A. & Catalano S.A. 2016. TNT version 1.5, including a full implementation of phylogenetic morphometrics. *Cladistics* 32: 1–18.
- Goloboff P. & Farris J. 2001. Methods for quick consensus estimation. *Cladistics* 17: S26–S34.
<https://doi.org/10.1006/clad.2000.0156>
- Goloboff P.A., Farris J.S., Källersjö M., Oxelman B., Ramírez M.J. & Szumik C.A. 2003. Improvements to resampling measures of group support. *Cladistics* 19: 324–332.
- Goloboff P.A., Farris S. & Nixon K. 2008. TNT, a free program for phylogenetic analysis. *Cladistics* 24: 774–786.

- Gonzalez Marquez M.E. & Ramírez M.J. 2012. A revision and phylogenetic analysis of the spider genus *Aysenia* Tullgren (Araneae: Anyphaenidae, Amaurobioidinae). *Zootaxa* 3201 (1): 1–26. <https://doi.org/10.11646/zootaxa.3201.1.1>
- Griswold C.E., Coddington J.A., Hormiga G. & Scharff N. 1998. Phylogeny of the orb-web building spiders (Araneae, Orbiculariae: Deinopoidea, Araneoidea). *Zoological Journal of the Linnean Society* 123 (1): 1–99. <https://doi.org/10.1111/j.1096-3642.1998.tb01290.x>
- Izquierdo M.A. & Ramírez M.J. 2008. Two new spider species of the genera *Aysenia* and *Aysenoides* from southern Chile and Argentina: description and phylogenetic relationships (Araneae: Anyphaenidae, Amaurobioidinae). *Zootaxa* 1861 (1): 29–43. <https://doi.org/10.11646/zootaxa.1861.1.3>
- Järvi T.H. 1912. Das Vaginalsystem der Sparassiden. *Annales Academiae Scientiarum Fennicae* (A) 4: 1–131.
- Koch L. 1866. Die Arachniden – Familie der Drassiden. Parts 1–6: 1–304.
- Labarque F.M., Soto E.M., Ramírez M.J. & Arnedo M.A. 2015. Chasing ghosts: the phylogeny of Amaurobioidinae ghost spiders (Araneae, Anyphaenidae). *Zoologica Scripta* 44 (5): 550–561.
- Laborda A., Ramirez M.J. & Pizarro-Araya J. 2013. New species of the spider genera *Aysenia* and *Aysenoides* from Chile and Argentina: description and phylogenetic relationships (Araneae: Anyphaenidae, Amaurobioidinae). *Zootaxa* 3731: 133–152. <https://doi.org/10.11646/zootaxa.3731.1.6>
- Nixon K.C. 2002. *Winclada*, ver. 1.00.08. Published by the author, Ithaca, NY.
- Oliveira L.F.M. & Brescovit A.D. 2015a. A taxonomic revision of the Neotropical spider genus *Xiruana* Brescovit 1997 (Araneae: Anyphaenidae, Anyphaeninae). *Zootaxa* 3980 (2): 201–229. <https://doi.org/10.11646/zootaxa.3980.2.3>
- Oliveira L.F.M. & Brescovit A.D. 2015b. Two new species of the Neotropical spider genus *Umuara* Brescovit (Araneae, Anyphaenidae, Anyphaeninae) from Brazil. *Zootaxa* 3980 (3): 435–441. <https://doi.org/10.11646/zootaxa.3980.3.7>
- Oliveira L.F.M. & Brescovit A.D. 2016. The first male of the spider genus *Temnida* Simon, 1896 (Araneae: Anyphaenidae: Anyphaeninae). *Arachnology* 17 (1): 47–51. <https://doi.org/10.13156/arac.2006.17.1.47>
- Petrunkévitch A. 1911. A synonymic index-catalogue of spiders of North, Central and South America with all adjacent islands, Greenland, Bermuda, West Indies, Terra del Fuego, Galapagos, etc. *Bulletin of the American Museum of Natural History* 29: 1–791.
- Petrunkévitch A. 1928. Systema Aranearum. *Transactions of the Connecticut Academy of Arts and Sciences* 29: 1–270.
- Platnick N.I. & Gertsch W.J. 1976. The suborders of spiders: a cladistic analysis (Arachnida, Araneae). *The American Museum of Natural History* 2607: 1–15.
- Pocock R.I. 1895. Description of two new species obtained by Messrs J.J. Quelch and F. Mc Connell on the summit of Mount Roraima, in Demerara, with a note upon the systematic position of the genus *Desis*. *Annals and Magazine of Natural History* 16 (6): 139–143. <https://doi.org/10.1080/00222939508680241>
- Pocock R.I. 1900. Myriapoda and Arachnida. In: *Report on a Collection made by M. M. F.V. McConnell and J.J. Quelch at Mount Roraima in British Guiana. Transactions of the Linnean Society of London* 2 (8): 64–71. <https://doi.org/10.1111/j.1096-3642.1900.tb00308.x>
- Ramírez M.J. 1995a. A phylogenetic analysis of the subfamilies of Anyphaenidae (Arachnida, Araneae). *Entomologica Scandinavica* 26: 361–384.

- Ramírez M.J. 1995b. Revisión y filogenia del género *Monapia*, con notas sobre otras Amaurobioidinae (Araneae, Anyphaenidae). *Boletín de la Sociedad de Biología de Concepción* 66: 71–102.
- Ramírez M.J. 1999. New species and cladistic reanalysis of the spider genus *Monapia* (Araneae: Anyphaenidae, Amaurobioidinae). *Journal of Arachnology* 27: 415–431.
- Ramírez M.J. 2003. The spider subfamily Amaurobioidinae (Araneae: Anyphaenidae): A phylogenetic revision at generic level. *Bulletin of the Museum of Natural History* 277: 1–262. <https://doi.org/fv3bxr>
- Ramírez M.J. 2007. Homology as a parsimony problem: a dynamic homology approach for morphological data. *Cladistics* 23: 588–612. <https://doi.org/10.1111/j.1096-0031.2007.00162.x>
- Ramírez M.J. 2014. The morphology and phylogeny of dionychan spiders (Araneae: Araneomorphae). *Bulletin of the American Museum of Natural History* 390: 1–374. <https://doi.org/10.1206/821.1>
- Ramírez M.J., Ansaldi M.J. & Puglisi A.F. 2004. Description of the females of *Oxysoma itambezinho* Ramírez and *Monapia tandil* Ramírez, and their effects on the generic relationships of Gayennini (Araneae, Anyphaenidae, Amaurobioidinae). *Zootaxa* 668 (1): 1–8.
- Roewer C.F. 1954. *Katalog der Araneae von 1758 bis 1940*. Vol. 2: 1–923. Royal Belgian Institute of Natural Sciences, Brussels.
- Rubio G.D. & Ramírez M.J. 2015. Taxonomic revision of the American spider genus *Arachosia* (Araneae: Anyphaenidae). *Zootaxa* 3932 (1): 1–105. <https://doi.org/10.11646/zootaxa.3932.1.1>
- Sereno P.C. 2007. Logical basis for morphological characters in phylogenetics. *Cladistics* 23: 565–587.
- Sierwald P. 1989. Morphology and ontogeny of female copulatory organs in American Pisauridae, with special reference to homologous features (Arachnida: Araneae). *Smithsonian Contributions to Zoology* 484: 1–24.
- Simon E. 1903. Descriptions d'Arachnides nouveaux. *Annales de la Société entomologique de Belgique* 47: 21–39.
- Soto M.E. & Ramírez M.J. 2012. Revision and phylogenetic analysis of the spider genus *Philisca* Simon (Araneae: Anyphaenidae, Amaurobioidinae). *Zootaxa* 3443 (1): 1–65. <https://doi.org/10.11646/zootaxa.3443.1.1>
- Soto M.E., Labarque M.F., Ceccarelli S.F., Arnedo A.M., Pizarro-Araya J. & Ramírez M. 2017. The life and adventures of an eight-legged castaway: colonization and diversification of *Philisca* ghost spiders on Robinson Crusoe Island (Araneae, Anyphaenidae). *Molecular Phylogenetics and Evolution* 107: 132–141. <https://doi.org/10.1016/j.ympev.2016.10.017>
- Werenkraut V. & Ramírez M.J. 2009. A revision and phylogenetic analysis of the spider genus *Coptoprepes* Simon (Araneae: Anyphaenidae, Amaurobioidinae). *Zootaxa* 2212 (1): 1–40. <https://doi.org/10.11646/zootaxa.2212.1.1>
- World Spider Catalog. 2020. *World Spider Catalog. Version 20.0*. Natural History Museum Bern. Available from <http://wsc.nmbe.ch> [accessed 26 Jun. 2020].

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Appendix 1

Species used in the phylogenetic analysis

Outgroup: Amaurobioidinae Hickman, 1949

Arachosia praesignis Keyserling, 1891

BRAZIL • 2 ♂♂, 1 ♀; São Paulo, São Paulo; [23°32'52" S, 46°38'09" W]; 31 Mar. 2007; F.U. Yamamoto leg.; IBSP 87975.

Outgroup: Anyphaeninae Bertkau, 1878

Anyphaena accentuata Walckenaer, 1802

GREECE • 1 ♂, 1 ♀; Kerkira Island; [39°40' N, 19°45' E]; Jan. 1995; Paganelli leg.; MCN 22140.

Patrera fulvastra Simon, 1903

COLOMBIA • 1 ♂, 1 ♀; Cundinamarca, Ricaurte, Nariño, Reserva Natural La Planada; [4°16'45" N, 74°46'22" W]; 14 Mar. 1992; C. Valderrama leg.; MCN 24208.

Aysa prospera Keyserling, 1891

BRAZIL • 1 ♂; São Paulo, Cotia; [23°36'14" S, 46°55'08" W]; 7 Sep. 1983; A. Felix leg.; IBSP 19780 • 1 ♀; Embú das Artes; [23°38'56" S, 46°51'07" W]; 13 Oct. 1990; [without name of collector]; IBSP 19783.

Xiruana gracilipes Keyserling, 1891

BRAZIL • 1 ♀; São Paulo, São Paulo, Parque Estadual do Jaraguá; [23°32'51" S, 46°38'10" W]; 28 Mar. 2014; J.L. Chavari and R. Indicatti leg.; IBSP 166120 • 1 ♂; Santa Catarina, Florianópolis; [27°35'49" S, 48°32'56" W]; 12 Feb. 2007; R.S. Melo leg.; IBSP 72660.

Ingroup: Anyphaeninae Bertkau, 1878; genus *Tafana* Simon, 1903

Tafana riveti Simon, 1903

COLOMBIA • 1 ♂; Valle del Cauca, Lago Calima; [3°53'40.44" N, 76°29'41.58" W]; Jan. 1979; W. Eberhard leg.; MCZ.

ECUADOR • 1 ♀; Quito, Pichincha, Monte Pichincha; [0°15'00" N, 78°35'00" W]; Oct. 1994; G.W. Prescott leg.; MCZ.

Tafana quelchi (Pocock, 1895)

VENEZUELA • 1 ♀; Bolívar, Parque Nacional Canaima, Monte Roraima; [5°20'00" N, 61°30'00" W]; [without date]; M.O. Gonzaga leg.; IBSP 32131.

BRAZIL • 1 ♀; Roraima, Monte Roraima; [5°03'00" N, 61°24'00"]; [without date]; G. Tate leg.; AMNH.

Tafana straminea (L. Koch, 1866)

COLOMBIA • 1 ♂; Departamento Boyacá, Paramo Alto Belén; [5°59'22" N, 72°54'44" W]; 23 Sep. 1985; H. Sturn leg.; MCZ.

ECUADOR • 2 ♀♀; Tungurahua Province, Baños; [1°23'47" N, 78°25'29" W]; 2 May 1939; Clarke and Macintyre leg.; AMNH.

Tafana silhavyi (Caporiacco, 1955)

VENEZUELA • 2 ♂♂, 2 ♀♀; Aragua, Colonia Tovar; [10°24'20" N, 67°17'22" W]; [without date]; E. Simon leg.; MNHN 11312.

Tafana chimire sp. nov.

VENEZUELA • 1 ♂; Chimire; [9°11'49.2" N, 66°00'32.4" W]; Jun. 1975; Martinez leg.; MACN-Ar.

Tafana maracay sp. nov.

VENEZUELA • 1 ♂, 2 ♀♀; Aragua, Colonia Tovar; [10°24'20" N, 67°17'22" W]; [without date]; E. Simon leg.; MNHN 11314.

Tafana arawak sp. nov.

VENEZUELA • 1 ♂, 1 ♀; Aragua, Colonia Tovar; [10°24'20" N, 67°17'22" W]; [without date]; E. Simon leg.; MNHN 11320.

Tafana pittieri sp. nov.

VENEZUELA • 1 ♂, 1 ♀; Aragua, Rancho Grande, current National Park Henri Pittier; [10°20'58" N, 67°41'08" W]; 8–15 Apr. 1945; W. Beebe *et al.* leg.; AMNH.

Tafana kunturmarqa sp. nov.

COLOMBIA • 1 ♂, 1 ♀; Cundinamarca Department, La Calera; [4°43'11" N, 73°58'12" W]; 30 Apr. 1978; C. Hernandez leg.; ICN-Ar.

Tafana oliviae sp. nov.

ARGENTINA • 1 ♂; Misiones, Santa María; [27°56'04" S, 55°24'25" W]; Nov–Dec. 1913; M.J. Viana leg.; MACN 3565 • 1 ♀; Cataratas del Iguazú [near Puerto Iguazú]; [25°41'43" S, 54°26'12" W]; Nov. 1970; M.E. Galiano leg.; MCZ.

Tafana humahuaca sp. nov.

ARGENTINA • 1 ♂; Jujuy Province, Santa Bárbara; [24°18'31" S, 64°39'37" W]; Oct. 1969; Williner leg.; MACN-Ar 41787 • 1 ♀; Jujuy Province, Santa Bárbara; [24°18'31" S, 64°39'37" W]; Oct. 1962; Williner leg.; MACN-Ar 41788.

Tafana orinoco sp. nov.

VENEZUELA • 2 ♂♂, 1 ♀; Mawaca, Central, Federal Territory of Amazonas; [3°10'22.73" N, 65°32'32.39" W]; 5 Mar. 1985; J. Lattke and R. Candia leg.; MIZA 07062.

Tafana pastaza sp. nov.

ECUADOR • 1 ♂, 1 ♀; Tungurahua Province, Pastaza Valley [between Baños and Mero]; [01°04'00" N, 78°00'24" W]; 1 Mar. 1949; W.C. Macintyre leg.; AMNH.

Tafana nevada sp. nov.

COLOMBIA • 1 ♂; Departament Magdalena, Santa Marta, San Pedro, Carmelo, Sierra Nevada de Santa Marta; [10°52'00" N, 73°43'12" W]; 7 Feb. 1974; J.A. Kochalka leg.; IBNP.

VENEZUELA • 1 ♀; Aragua, Rancho Grande; [10°38'30" N, 68°00'31" W]; 4 Mar. 1959; A.M. Nadler leg.; AMNH.

Tafana huatanay sp. nov.

ECUADOR • 3 ♂♂, 1 ♀; Quito, Golf Club; [0°15'00" N, 78°35'00" W]; 21 Dec. 1958; A.M. Nadler leg.; AMNH.

Tafana ruizi sp. nov.

COLOMBIA • 1 ♂, 1 ♀; Departamento de Caldas, Pensilvania; [5°23'02" N, 75°09'40" W]; 10 Oct. 2003; Sánchez-Ruiz leg.; IBSP 258183.

Appendix 2

Characters used in the phylogenetic analysis

Bibliographic references are given for characters already employed in previous phylogenetic analyses. Characters that have not been employed so far in phylogenetic analyses are identified by an asterisk and all alternative states are referenced on figures presented here. Values of length (L), consistency index (ci), retention index (ri) and Fit (F) are indicated for each character based on the topology under implicit weighing (IW), with value of concavity ($k=7$) (Fig. 5).

Cephalothorax

0*. **Cephalothorax, carapace, dorsal, anterior margin shape:** (0) rounded (Fig. 6A); (1) square (Figs 6B, 8A). L=1; ci=1; ri=1; F=1. The anterior margin of carapace optimized as square is a synapomorphy for Anyphaeninae.

1*. **Cephalothorax, carapace, ratio clypeus/AME:** (0) clypeus<AME; (1) clypeus=AME; (2) clypeus>AME. L=7; ci=0.28; ri=0.28; F=0.58. Most anyphaenid species present differences in shape and size of eyes, but the clypeus is conservative in shape. This character is very homoplastic, the (state 2) is a synapomorphy for Amaurobioidinae, but appears as an autapomorphy in *Tafana quelchi*. The (state 0) is an apomorphy for Anyphaeninae, with reversion in *Aysha prospera* and other groups of *Tafana* and (state 1) appears independently in other species of Anyphaeninae.

2. **Cephalothorax, carapace, cephalic area, posterior eye row** (Ramírez 2003, character 12, modified): (0) procurved or straight (Figs 6B, 10A, 11A); (1) extremely procurved (Fig. 6A). L=1; ci=1; ri=1; F=1. The state procurved in posterior eyes is generalized in Anyphaenidae according to Ramírez (1995b: 75). Anyphaenids not included in this analysis have posterior eyes recurved (Ramírez 1995b, 2003). The (state 0) is recovered as a synapomorphy for species of Anyphaeninae.

Chelicerae

3. **Chelicerae, paturon, number of retromarginal teeth** (Ramírez 2003, character 20): (0) two (Fig. 6C); (1) four or more (Figs 8B, 20F, 26F). L=1; ci=1; ri=1; F=1. The (state 1) is a synapomorphy for Anyphaeninae.

4. **Chelicerae, paturon, number of promarginal teeth** (Ramírez 2003, character 23): (0) three (Fig. 6C); (1) four (Fig. 20F); (2) five or more (Fig. 26F). L=2; ci=1; ri=1; F=1. The number of teeth has been used in phylogeny studies within Anyphaenidae (Ramírez 2003). This character shows a great variation in the groups studied herein. The (state 1) is recovered as a synapomorphy for Anyphaeninae, but reversed in *Anyphaena accentuata* and *Patrera fulvastra*. The (state 2) is a synapomorphy for the clade *Tafana maracay* sp. nov. + *Tafana arawak* sp. nov.

Scopulae

5. **Scopulae on anterior tibiae** (Ramírez 2003, character 33): (0) absent (Fig. 6G); (1) present (Fig. 6F). L=5; ci=0.20; ri=0.55; F=0.63. As in the analysis of Ramírez (2003), the scapulae in this analysis also features lost in several groups. The (state 0) is recovered as a synapomorphy for *silhavyi* group + *riveti* group, but reversed in *Anyphaena accentuata*, *Tafana silhavyi*, *Tafana pastaza* sp. nov. and *Tafana straminea*.

Spines

6. **Female palpal femur with a line of ventral spines** (Ramírez 2003, character 130): (0) absent (Fig. 6E); (1) present (Fig. 6D). L=4; ci=0.25; ri=0.66; F=0.70. The character is recovered as homoplastic. The (state 1) appears as an autapomorphy in *Aysha prospera* and synapomorphic for clades B and G. In clade G a reversion is observed in *Tafana humauaca* sp. nov.

Tracheae

7. **Position of first bifurcation of median trachea** (Ramírez 1995a, 2003, character 40): (0) separate from lateral trachea (Ramírez 1995a: 363, fig. 5); (1) contiguous (Ramírez 1995a: 364, fig. 6; Fig. 4L). L=1; ci=1; ri=1; F=1. The (state 1) is recovered as synapomorphic for Anyphaeninae species.

Male palp

8*. **Palp, cymbium, retrolateral projection:** (0) absent (Fig. 29C); (1) present (Figs 10C, 25C). L=1; ci=1; ri=1; F=1. The retrolateral projection is an extension of the cymbium and starting basally and continuing up to half region. The presence of this structure is recovered as synapomorphic for clade B.

9. **Palp, tibiae, retrolateral tibial apophysis** (Ramírez 2003, character 42): (0) absent (Fig. 6H); (1) present (Figs 6I, 9A, 10D). L=1; ci=1; ri=1; F=1.

10*. **Palp, tibiae, shape of retrolateral tibial apophysis:** (0) unbranched (Fig. 10D–E); (1) branched (Figs 13C, 27D). L=5; ci=0; ri=0; F=0. The branches of the branched retrolateral tibial apophysis may be placed either at the base of the tegument or at its apex. It is recovered as highly homoplastic, appearing several times in Anyphaeninae.

11*. **Palp, tibiae, median tibial apophysis:** (0) absent (Figs 10D, 22D); (1) present (Figs 29D, 30D). L=2; ci=0.50; ri=0.66; F=0.87. The median tibial apophysis is treated here as projections, which arise in the middle of the tibia of the palp in males independently of the position. Several Anyphaeninae present these structures in tibia in the male palp. In the genus *Tafana* they appear at the base as a plesiomorphy, and later are lost in clades D and G.

12*. **Palp, tibiae, position of median tibial apophysis:** (0) retrolateral (Fig. 30D–E); (1) dorsal (Fig. 29D–E). L=1; ci=1; ri=1; F=1. The dorsal position is an autapomorphy for *Tafana oliviae* sp. nov.

13*. **Palp, tibiae, shape of median tibial apophysis:** (0) conical (Fig. 30D); (1) bilobed (Fig. 29D); (2) keel (Fig. 6I). L=2; ci=1; ri=1; F=1.

Copulatory bulb

14. **Bulb, tegulum, basal notch on tegulum** (Ramírez 2003, character 60): (0) absent (Figs 10C, 11C); (1) present (Fig. 6J). L=1; ci=1; ri=1; F=1. The presence of a basal notch on the tegulum is a synapomorphy for Amaurobioidinae.

15*. **Bulb, tegulum, ventral position, shape sperm duct:** (0) oblique (Fig. 6J); (1) U-shaped (Figs 9B, 10C); (2) inverted S-shaped (Figs 9A, 22C). L=4; ci=0.50; ri=0.66; F=0.77. Both Anyphaenidae and other families have a variation of shape in the sperm duct. For example, the standard for the Corinninae sperm duct in the tegulum is helicoidal (Bonaldo 2000). We agree to consider the standard for several Anyphaeninae as semi-circular or ‘U-shaped’ in the unexpanded male palp, the oblique sperm duct is synapomorphic for Amaurobioidinae and the ‘S-shaped’ sperm duct is homoplastic, appearing independently in *Aysha prospera* and in the *silhavyi* group (clade D).

16*. **Bulb, tegulum, ventral position, secondary horizontal loop of the SD:** (0) absent (Figs 9B, F, 10C); (1) present (Figs 9A, D, 25C). L=2; ci=0.50; ri=0.80; F=0.87. The (state 1) appears as homoplastic for *Aysha prospera* and the *silhavyi* group (clade D).

17*. **Bulb, tegulum, basal protuberance of tegulum:** (0) absent (Figs 10C, 12A, 18A); (1) present (Figs 24C, 26C). L=1; ci=1; ri=1; F=1. The protuberance corresponds to an extension of the tegulum located in the prolateral basal region. The (state 1) is recovered as synapomorphic in the *silhavyi* group (clade D).

18*. **Bulb, tegulum, ventral tegular process:** (0) absent (Fig. 6J, L); (1) present (Figs 6K, 10C, 11C). $L=4$; $ci=0.25$; $ri=0.40$; $F=0.70$. As defined by Brescovit (1997), the ventral tegular process corresponds to an extension of the tegulum presenting several shapes and positions, sometimes playing the role of conductor. It can be totally or partially sclerotized. We consider the structure as not being homologous to the conductor, either in Amaurobioidinae or in Anyphaeninae. The structure appears several times in the analysis: in *Xiruana gracilipes* it is more hyaline and in *Anyphaena accentuata* it is more massive. In the *riveti* and *silhavyi* groups, it appears as apomorphic, but reversed in *Tafana pastaza* sp. nov.

19*. **Bulb, tegulum, ventral tegular process, position:** (0) apical margin of tegulum (Figs 6J, 24C, 26A–B); (1) near median apophysis (Figs 9B, 10C, 12B). $L=1$; $ci=1$; $ri=1$; $F=1$. In *Tafana*, the position of the ventral tegular process near the median apophysis is recovered as synapomorphic in the *riveti* group (clade G).

20. **Bulb, shape of median apophysis** (Ramírez 2003, character 65): (0) relatively thick (Fig. 6K); (1) slender and elongate (Figs 6L, 12B–C). $L=2$; $ci=0.50$; $ri=0$; $F=0.87$.

21*. **Bulb, tegulum, embolic process:** (0) absent (Fig. 6J, L); present (Figs 6I, K, 9C–F). $L=1$; $ci=1$; $ri=1$; $F=1$. We consider the embolic process as a sclerite apart from that formed at the base of the tegulum, in which the sperm duct runs up to the apex and connects to the embolus. The process is usually located behind the tegulum and it is better seen when the male copulatory bulbs are expanded (see Brescovit 1997: 11). The structure is apomorphic for Anyphaeninae, but lost in *Anyphaena accentuata* and *Patrera fulvastra*. This structure is a putative homology for at least ten genera of Anyphaeninae.

22*. **Bulb, tegulum, shape of embolic process:** (0) ring (Brescovit 1992b: 79, figs 8–11); (1) conical (Fig. 9C–F). $L=1$; $ci=1$; $ri=1$; $F=1$. The (state 0) is autapomorphic for *Aysa prospera*.

23*. **Bulb, embolus, apophysis at the base of the embolus:** (0) absent (Fig. 6J, K); (1) present (Figs 9A–F, 12B, C, 23B–C). $L=1$; $ci=1$; $ri=1$; $F=1$. The RTA clade presents an articulated embolus free or fixed in the copulatory bulb (Ramírez 2003: 277; 2014: 247). This base can be in the apical region as in most Anyphaeninae or in the basal region as for example in *Patrera*. We consider that a large embolar base is a region sclerotized with or without apophysis. When present the apophysis can be unique or bifid and its form can be laminar or conical. The (state 1) is recovered as synapomorphic for *Tafana*.

24*. **Bulb, embolus, lobes on apophysis at the base of the embolus:** (0) simple (Figs 9C, D, 18B, C); (1) bilobed (Figs 16C, 31A–C). $L=2$; $ci=0.50$; $ri=0$; $F=0.87$. The (state 1) appears independently in *Tafana orinoco* sp. nov. and in *Tafana pastaza* sp. nov.

25*. **Bulb, embolus, shape of apophysis at the base of the embolus:** (0) conical (Figs 9B, 12C, 18B, 20B); (1) laminar (Figs 9C, D, 23B, 26B, C). $L=1$; $ci=1$; $ri=1$; $F=1$. The (state 1) is a synapomorphy for the *silhavyi* group.

26*. **Bulb, tegulum, conductor:** (0) absent (Figs 10C, 22C, 23B–C); (1) present (Fig. 6J–K). $L=2$; $ci=0.50$; $ri=0$; $F=0.87$. The conductor is common in the *Dionyssa* groups of spiders and its homology is contentious (Ramírez 2014: 249). In Anyphaeninae, the conductor is a sclerotized structure of tegular origin that conducts and supports the embolus totally or partially (Brescovit 1997: 10). The structure presents a potential homology to the “primary conductor” mentioned by Ramírez (2003: 19, 2007). The (state 1) is a synapomorphy for Amaurobioidinae. In Anyphaeninae the conductor is plesiomorphic, being lost in many groups such as the genus *Tafana*.

27*. **Bulb, embolus, length of embolus:** (0) long (Figs 6L, 9D); (1) short, up to half as long as embolus (Figs 10C, 14C). L=3; ci=0.33; ri=0.66; F=0.77. The (state 0) appears three times independently in this analysis. In *Tafana* it is a synapomorphy for the *silhavyi* group.

28*. **Bulb, embolus, shape of embolus:** (0) laminar (Figs 6I, 29C); (1) filiform (Figs 6L, 10C, 12C). L=2; ci=0.50; ri=0.50; F=0.87. The laminar condition of the embolus is its flattening in more than half or totally. Sometimes, just the apex of the embolus is filiform in some groups. The (state 1) is plesiomorphic for *Tafana* with an autapomorphy for *Tafana pastaza* sp. nov. The (state 0) appears several times in the topology.

Genitalia of female

29. **Epigynum, anterior fold, hood** (Azevedo *et al.* 2018, character 98): (0) absent (Figs 7C, E, 32A–D) (1) present (Figs 7D, 10F, 20E, 22F, 32E–L, 33A–I). L=2; ci=0.50; ri=0.50; F=0.87. The hood is a structure that covers part of the epigynal plate. The (state 1) is plesiomorphic for *Tafana* with loss in *Aysha prospera* and *Xiruana gracilipes*.

30*. **Epigynum, anterior fold, shape of hood:** (0) semicircular (Figs 11F, 14F, 32H, J, 33A); (1) triangular (Figs 7D, 10F–G, 22F, G, 26D, 32F–G, 33D–H); (2) circular (Figs 12F–G, 29F–G, 31I, 32I). L=7; ci=0.28; ri=0.28; F=0.58.

31. **Epigynum, anterior fold, posterior extension forming the lateral lobe** (Azevedo *et al.* 2018, character 97, modified): (0) absent (Figs 7C, E, 11F, 14F, 16F, 32F, I–J, 33G, I); (1) present (Figs 15F, 17F, 19F, 26D, 32G, 33A). L=4; ci=0.25; ri=0.40; F=0.70. This character was coded differently from the phylogeny of Gnaphosidae proposed by Azevedo *et al.* (2018). In Anyphaeninae there are no lateral tips with longitudinal furrows. However, this character is interesting due to the lateral lobes being homologous to “die epigynale Falte (Furche)” in Järvi (1912) or the “lateral folds” by Sierwald (1989), and it is associated with the internal copulatory ducts and openings. We consider that the lateral lobes extend from the posterior region to the anterior region connecting to the hood. The (state 1) is recovered independently several times within the topology.

32*. **Epigynum, shape of lateral lobes:** (0) straight (Fig. 7C–D); (1) sinuous (Figs 10G, 13F, 17F, 27F, 28F); (2) curved (Fig. 7E). L=2; ci=1; ri=1; F=1.

33. **Epigynum, median depression on epigynum** (Ramírez 2003, character 108): (0) absent (Fig. 7C, E); (1) present (Figs 7D, 13F). L=2; ci=0.50; ri=0.50; F=0.87. The epigynal plate presents an excavation on the median field that extends from the anterior region to the posterior region.

34*. **Epigynum, median field, shape of atrium:** (0) wide (Figs 22F, 27F, 32F, I, 33E–F); (1) narrow (Figs 7C, 10F, 15F). L=3; ci=0.33; ri=0.71; F=0.77.

35*. **Epgynum, atrial septum:** (0) absent (Figs 10F, 13F, 22F, 27F); (1) present (Figs 11F, 14F–G, 21F, 32H, J, 33C). L=1; ci=1; ri=1; F=1. The atrial septum is a cuticular elevation in the excavation of the median field.

36*. **Epigynum, posterior region covered by cuticle:** (0) absent (Figs 13F, 15F, 16F); (1) present (Figs 10F, 17F, 19F, 21F, 33F–G). L=3; ci=0.33; ri=0.75; F=0.77. The posterior region of the epigynal plate sometimes presents a cuticle covering the lateral lobes without division (see Brescovit 1997: 174, fig. 238, *Tafana riveti*). In the species that do not have this cuticle, an excavation of the median field is present (see above character 33). The (state 1) is recovered as apomorphic in *Tafana*, but it is reversed in the two major groups.

37. **Vulva, copulatory duct, lumen of proximal part of duct** (Ramírez 2003, character 119): (0) thin (Figs 15G, 16G, 17G, 32B, D, 33G); (1) wide (Figs 22G, 26D, 27G, 30G, 33D–F). L=3; ci=0.33; ri=0.71; F=0.77. The wide condition is homoplastic, appearing independently in clades B, E and *Tafana riveti* + clade H.

38. **Vulva, primary spermathecae contiguous** (Ramírez 2003, character 125, modified): (0) separate, $\frac{1}{2}$ to 1 diameter (Figs 13G, 28G, 29G, 32I, 33G–I); (1) contiguous, up to $\frac{1}{3}$ diameter (Figs 10G, 15G, 19G, 20E, 32G–H, 33A–F). L=4; ci=0.25; ri=0.25; F=0.70. Several anyphaenid species present variation in size and shape of the primary spermathecae. Herein, we compared the separation with its circumference. The (state 1) is highly homoplastic.

39. **Vulva, primary spermathecae, shape** (Ramírez 2003, character 124): (0) irregular (Fig. 32 A, D, I); (1) approximately oval (Figs 32B, G, H, J, 32D–E). L=2; ci=0.50; ri=0; F=0.87.

40. **Vulva, receptacle in copulatory duct, in addition to primary and secondary spermathecae** (Ramírez 2014, character 374): (0) absent (Figs 20E, 22G, 26D, 32G); (1) present (Figs 16G, 32L). L=1; ci=1; ri=1; F=1. The receptacles in the primary and secondary spermathecae are common in spiders of the Entelegynes condition (Ramírez 2014: 251, 390, fig. 179E).

41*. **Vulva, secondary spermathecae, position:** (0) proximal lumen of CD (Figs 32B, 33C, H); (1) middle lumen of CD (Fig. 32C, G, L); (2) distal lumen of CD (Figs 32E–F, 33B, F). L=8; ci=0.25; ri=0.25; F=0.53. The secondary spermathecae are receptacles with large glandular pores and ducts. They have different shapes and positions in the copulatory ducts. We consider their position as homologous as suggested by Ramírez (2014: 251).

42*. **Vulva, secondary spermathecae, shape:** (0) irregular (Figs 32B, D, F, 33G–H); (1) approximately rounded (Figs 32C, G–H, J, 33D, F). L=3; ci=0.33; ri=0.60; F=0.77. The spherical condition appears twice in the analysis in *Xiruana gracilipes* and in the other groups of *Tafana*, with reversal in *Tafana pittieri* sp. nov. The irregular condition is plesiomorphic for *Tafana*.

Data matrix used in the phylogenetic analysis

Abbreviations: CB= Copulatory bulb; CE= Chelicerae; CH= Cephalothorax; GF= Genitalia of female; MP= Male palp; SC= Scopulae; SP= Spines; T= Tracheae.

Taxa	CE			CH	SC	SP	T	MP			CB												GF																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42			
<i>Arachosia praesignis</i> Keyserling, 1891	0	2	1	0	0	1	0	0	0	—	0	—	—	1	0	0	0	—	1	1	0	—	—	1	1	0	—	1	1	0	—	0	0	0	1	0	0	1	1	0	0	0	0	0		
<i>Axyphaena accentuata</i> Walekenaer, 1802	1	0	0	1	0	0	1	0	1	1	0	—	—	0	1	0	0	1	0	1	0	1	0	—	—	0	—	0	1	1	0	0	0	1	0	0	0	1	0	0	1	1	0	2	0	0
<i>Patrera fulvastra</i> Simon, 1903	1	0	0	1	0	1	0	?	0	1	0	0	—	—	0	1	0	0	0	—	1	0	—	—	0	—	—	0	0	1	1	0	0	1	0	0	0	0	1	1	0	2	0	0		
<i>Ayscha prospera</i> Keyserling, 1891	1	1	0	1	1	1	1	0	1	0	1	0	2	0	2	1	0	0	—	1	1	0	0	—	—	0	0	0	—	0	0	0	—	0	0	0	0	0	0	1	0	0	1	0	0	
<i>Xiruana gracilipes</i> Keyserling, 1891	1	0	0	1	1	1	0	?	0	1	1	1	0	0	0	0	0	1	0	0	1	0	1	0	—	—	1	1	0	—	0	0	—	2	0	0	0	0	1	1	0	1	1	0	1	
<i>Tafana quelchi</i> Pocock, 1895	1	2	0	1	1	0	1	?	1	1	1	0	—	—	0	1	0	0	1	1	1	1	0	0	1	1	0	0	1	1	2	0	1	1	0	0	0	0	0	0	0	1	1	0	1	
<i>Tafana riveti</i> Simon, 1903	1	0	0	1	1	0	1	?	1	1	0	0	—	—	0	1	0	0	1	1	1	1	1	0	0	1	1	0	0	1	1	1	0	1	0	1	0	1	1	1	0	1	1	0	1	
<i>Tafana silhavyi</i> Caporiacco, 1955	1	0	0	1	1	1	0	1	1	1	0	0	—	—	0	2	1	1	0	1	1	1	1	0	1	1	0	1	0	1	1	1	1	1	0	0	1	1	1	1	0	2	1	1		
<i>Tafana straminea</i> L. Koch, 1866	1	0	0	1	1	1	1	?	1	1	0	0	—	—	0	1	0	0	1	1	1	1	1	0	0	1	1	0	0	1	1	0	0	1	0	1	1	1	1	1	0	1	1	1		
<i>Tafana chinire</i> sp. nov.	1	0	0	1	1	0	?	?	1	1	0	0	—	—	0	2	1	1	0	1	1	1	0	1	0	1	0	1	0	1	?	?	?	?	?	?	?	?	?	?	?	?	?	?		
<i>Tafana maracay</i> sp. nov.	1	0	0	1	2	0	0	?	1	1	0	0	—	—	0	2	1	1	0	1	1	1	1	0	1	0	1	0	1	1	1	1	1	0	0	1	1	1	0	2	1	1	0	2		
<i>Tafana arewak</i> sp. nov.	1	1	0	1	2	0	0	?	1	1	1	0	—	—	0	2	1	1	0	1	1	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	1	1	1	0	2	1	1	0	2	
<i>Tafana pitieri</i> sp. nov.	1	0	0	1	1	0	0	?	1	1	0	0	—	—	0	2	1	0	1	0	1	1	1	0	1	0	1	0	0	1	1	1	0	1	0	0	0	0	0	1	0	1	0	0		
<i>Tafana kunturmarga</i> sp. nov.	1	0	0	1	1	0	1	?	1	1	0	0	—	—	0	1	0	0	1	1	1	1	1	0	0	1	0	0	1	1	0	0	1	0	1	1	1	1	1	0	2	1	1	0	2	
<i>Tafana oliviae</i> sp. nov.	1	0	0	1	1	1	0	?	0	1	1	1	1	1	0	1	0	0	—	1	1	1	1	1	0	0	1	1	0	1	1	0	1	1	0	0	1	0	0	1	0	0	0	0		
<i>Tafana humahuaca</i> sp. nov.	1	1	0	1	1	0	0	?	1	1	0	0	—	—	0	1	0	0	1	1	1	1	1	0	0	1	0	0	0	1	1	0	0	1	0	1	0	0	1	1	0	2	1	1	0	2
<i>Tafana orinoco</i> sp. nov.	1	0	0	1	1	1	1	?	1	1	0	1	0	0	0	1	0	0	—	1	1	1	1	1	0	0	1	1	1	2	1	1	0	0	1	0	0	1	1	0	1	0	2	1		
<i>Tafana pastaza</i> sp. nov.	1	1	0	1	1	1	1	1	1	0	0	—	—	0	1	0	0	0	—	0	1	1	1	0	1	1	0	1	0	1	1	0	1	0	1	0	0	1	1	1	1	1	1	1	1	
<i>Tafana nevada</i> sp. nov.	1	0	0	1	1	0	1	?	1	1	0	0	—	—	0	1	0	0	1	1	1	1	1	1	0	0	0	1	1	1	0	1	1	0	0	1	0	0	1	0	1	0	2	1	1	
<i>Tafana huatanay</i> sp. nov.	1	1	0	1	1	0	1	?	1	1	0	0	—	—	0	1	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	0	1	0	1	0	1	1	0	2	1	1		
<i>Tafana ruizi</i> sp. nov.	1	1	0	1	1	0	1	?	1	1	0	0	—	—	0	1	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1		

Appendix 3 (continued)**Data used in the phylogenetic analysis**

Similarity obtained through SPR-distances for (EW) trees and with different concavity for (IW). Values in bold below indicate the average between the topologies.

	EW	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K15	K20	K30	K40	K50	K60	K70	K80	K90	K100
EW	1.000	0.777	0.888	0.888	0.888	0.777	0.777	0.777	0.777	0.777	0.777	0.944	0.944	0.944	0.944	0.944	0.944	1.000	0.944	0.944	0.944
K1	0.666	1.000	0.833	0.833	0.833	0.777	0.777	0.833	0.833	0.833	0.833	0.666	0.666	0.666	0.666	0.666	0.666	0.666	0.666	0.666	0.666
K2	0.833	0.888	1.000	1.000	1.000	1.000	1.000	0.944	0.944	0.944	0.944	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833
K3	0.833	0.888	1.000	1.000	1.000	1.000	1.000	0.944	0.944	0.944	0.944	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833
K4	0.833	0.888	1.000	1.000	1.000	1.000	1.000	0.944	0.944	0.944	0.944	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833	0.833
K5	0.722	0.888	1.000	1.000	1.000	1.000	1.000	0.944	0.944	0.944	0.944	0.777	0.777	0.777	0.777	0.777	0.777	0.722	0.777	0.777	0.777
K6	0.722	0.888	1.000	1.000	1.000	1.000	1.000	0.944	0.944	0.944	0.944	0.777	0.777	0.777	0.777	0.777	0.777	0.722	0.777	0.777	0.777
K7	0.777	0.888	0.944	0.944	0.944	0.944	1.000	1.000	1.000	1.000	1.000	0.833	0.833	0.833	0.833	0.833	0.833	0.777	0.833	0.833	0.833
K8	0.777	0.888	0.944	0.944	0.944	0.944	1.000	1.000	1.000	1.000	1.000	0.833	0.833	0.833	0.833	0.833	0.833	0.777	0.833	0.833	0.833
K9	0.777	0.888	0.944	0.944	0.944	0.944	1.000	1.000	1.000	1.000	1.000	0.833	0.833	0.833	0.833	0.833	0.833	0.777	0.833	0.833	0.833
K10	0.777	0.888	0.944	0.944	0.944	0.944	1.000	1.000	1.000	1.000	1.000	0.833	0.833	0.833	0.833	0.833	0.833	0.777	0.833	0.833	0.833
K15	0.944	0.777	0.888	0.888	0.888	0.833	0.833	0.833	0.833	0.833	0.833	1.000	1.000	1.000	1.000	1.000	1.000	0.944	1.000	1.000	1.000
K20	0.944	0.777	0.888	0.888	0.888	0.833	0.833	0.833	0.833	0.833	0.833	1.000	1.000	1.000	1.000	1.000	1.000	0.944	1.000	1.000	1.000
K30	0.944	0.777	0.888	0.888	0.888	0.833	0.833	0.833	0.833	0.833	0.833	1.000	1.000	1.000	1.000	1.000	1.000	0.944	1.000	1.000	1.000
K40	0.944	0.777	0.888	0.888	0.888	0.833	0.833	0.833	0.833	0.833	0.833	1.000	1.000	1.000	1.000	1.000	1.000	0.944	1.000	1.000	1.000
K50	0.944	0.777	0.888	0.888	0.888	0.833	0.833	0.833	0.833	0.833	0.833	1.000	1.000	1.000	1.000	1.000	1.000	0.944	1.000	1.000	1.000
K60	0.944	0.777	0.888	0.888	0.888	0.833	0.833	0.833	0.833	0.833	0.833	1.000	1.000	1.000	1.000	1.000	1.000	0.944	1.000	1.000	1.000
K70	1.000	0.777	0.888	0.888	0.888	0.777	0.777	0.777	0.777	0.777	0.777	0.944	0.944	0.944	0.944	0.944	0.944	1.000	0.944	0.944	0.944
K80	0.944	0.777	0.888	0.888	0.888	0.833	0.833	0.833	0.833	0.833	0.833	1.000	1.000	1.000	1.000	1.000	1.000	0.944	1.000	1.000	1.000
K90	0.944	0.777	0.888	0.888	0.888	0.833	0.833	0.833	0.833	0.833	0.833	1.000	1.000	1.000	1.000	1.000	1.000	0.944	1.000	1.000	1.000
K100	0.944	0.777	0.888	0.888	0.888	0.833	0.833	0.833	0.833	0.833	0.833	1.000	1.000	1.000	1.000	1.000	1.000	0.944	1.000	1.000	1.000
Average	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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