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THE SPIDER GENUS *MAZAX* (ARANEAE: CORINNIDAE: CASTIANEIRINAE) NEWLY RECORDED FROM SOUTH AMERICA, WITH THE DESCRIPTION OF A NEW SPECIES

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ABSTRACT

The spider genus *Mazax* O. P.-Cambridge, 1898 (Araneae: Corinnidae: Castianeirinae) is reported from South America for the first time. A new species, *M. ramirezi* **sp. nov.**, is described and illustrated, and SEM images of the genus *Mazax* are presented here for the first time. The exclusive morphology of the secondary spermathecae (not oval and lung-shaped) indicates that the specimens described herein clearly belong to a new species of *Mazax*. An updated dichotomous key to the known species of the genus is provided.

Key Words: ant-mimicking, Argentina, Castianeirinae, spider taxonomy

RESUMEN

El género *Mazax* O. P.-Cambridge, 1898 (Araneae: Corinnidae: Castianeirinae) es registrado por primera vez para Sudamérica. Es descrita e ilustrada una nueva especie, *M. ramirezi* **sp. nov.**, aquí se presentan por primera vez imágenes MEB del género *Mazax*. De acuerdo con la morfología única de las espermatecas secundarias (no ovaladas y en forma de pulmón), los especímenes que aquí se describen pertenecen claramente a una nueva especie de *Mazax*. Se provee una actualización de la clave dicotómica para las especies conocidas del género.

Palabras Clave: mimetismo de hormigas, Argentina, Castianeirinae, taxonomía de arañas

The castianeirine genus *Mazax* (Araneae: Corinnidae: Castianeirinae) was described by O. Pickard-Cambridge (1898) and currently includes 6 species of ant-mimicking spiders, occurring mainly in Central America. Only 2 species, *M. pax* Reiskind and *M. kaspari* Cokendolpher, extend the distribution of the genus to the southern USA, i.e., in Texas. Until now, Panamá has been the southernmost country in the distribution range of the genus (Platnick 2014). *Mazax ajax* Reiskind, *M. chickeringi* Reiskind, *M. spinosa* (Simon), and *M. xerxes* Reiskind are the remaining valid species of this genus.

Because of considerable somatic and genitalic similarities, species that were earlier placed within some other castianeirine genera, e.g., *Apochinomma* Pavesi, *Corinnomma* Karsch, *Mazax* and *Myrmecotypus* O. Pickard-Cambridge, have recently been transferred to more appropriate taxa (Reiskind 1969; Deeleman-Reinhold 2001; Haddad 2006, 2012b). Within the Castianeirinae, the genera cannot be well defined on the basis of their genitalia. Despite morphological convergences inherent to mimicry, there are many characteristics (not directly involved with mimicry) that are useful for differentiating genera (Reiskind 1969) including relative size of the eyes, arrangement of the eye rows, elongation of the carapace and abdomen, leg morphology, presence of diagnostic spines or setae, integument textures, dorsal and ventral abdominal sclerites, pigmentation, etc. (Reiskind 1969, 1971; Deeleman-Reinhold 2001; Haddad 2004, 2006, 2012a, b, 2013; Rubio et al. 2013). Such characteristics are important, even preferable, if they are complementary to genitalic structures, to separate the Castianeirinae genera.

On the other hand, *Mazax* can be easily distinguished from other American Castianeirinae by their most important diagnostic characteristic - the abdomen has a distinct, rugose, anterior petiole (Fig. 1A-D). Other characteristics are the recurved anterior eye row, nearly straight posterior eye row, and eyes moderately large and approximately equal, with the anterior median eyes

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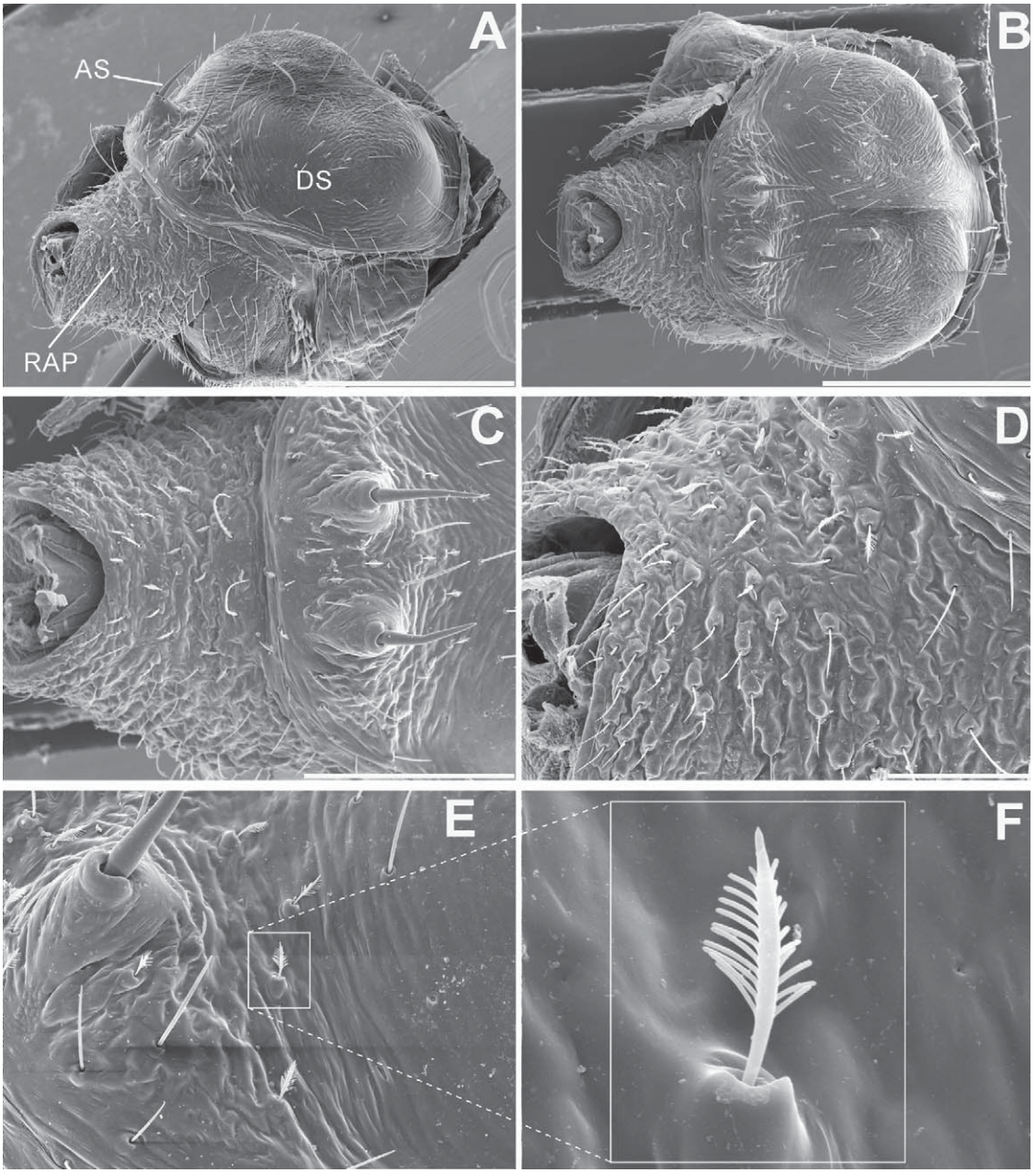


Fig. 1. SEM micrographs of female of *Mazax ramirezi* **sp. nov.** (MACN-Ar 30734). A. Anterior half of abdomen with dorsal scutum (DS) in dorsolateral view; B. Same in dorsal view; C. Rugose abdominal petiole (RAP) and abdominal setae (AS) in dorsal view; D. Details of RAP in dorsolateral view; E. Base of an AS and feathery setae; F. Close up view of a feathery seta. Scale bars: A-B (1 mm); C (0.5 mm); D-E (0.2 mm).

slightly smaller than the anterior lateral eyes (Reiskind 1969). Only spiders of the genus *Serendib* Deeleman-Reinhold from Southeast Asia have a rugose petiole, and are somewhat similar to *Mazax* (see diagnosis below).

Reiskind (1969) carried out a revision of the Castianeirinae from North and Central America, concluding that much more extensive collections will be needed to clarify the origin and distribution of South American species of this subfamily, a view supported by subsequent authors (Cokendolpher 1978; Rubio & Arbino 2009). The present work extends the geographical distribution of *Mazax*, and describes one

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new species from Argentina that represents the southernmost record of the genus so far, and the first for South America. Additionally, an updated dichotomous key (Reiskind 1969) and a brief table of characteristics (Table 1) of the species of the genus are also given here for comparative purposes.

Materials and Methods

Morphological terms, abbreviations and the format of the description are standard for arachnology, and generally follow Reiskind (1969) and Haddad (2012a, b). Abbreviations used are as follows: AER—anterior eye row; AERW—anterior eye row width; AL—abdomen length; ALE—anterior lateral eye; AME—anterior median eye; AS—abdominal setae; AW—abdomen width; CD—copulatory duct; CL—carapace length; CO—copulatory opening; CW—carapace width; DS—dorsal scutum; ES—epigastric sclerite; FL—fovea length; IS—inframamillary sclerite; LL—lateral loop; ML—medial loop; PER—posterior eye row; PERW—posterior eye row width; PLE—posterior lateral eye; PME—posterior median eye; RAP—rugose abdominal petiole; SL—sternum length; ST I—spermatheca I (posterior); ST II—spermatheca II (anterior); SW—sternum width; TL—total length; VE—ventral sclerite. Leg spination includes the following abbreviations: do—dorsal; pl—prolateral; plv—prolateral ventral; rl—retrolateral; rlv—retrolateral ventral; vt—ventral terminal.

Female genitalia were examined after digestion in a hot 10-20% KOH solution. Temporary preparations were analyzed by compound microscope. Photographs of the preserved specimens and sexual structures were taken by a Leica® DFC295 digital camera attached to a Leica® M205A stereomicroscope, and focal planes were composed by LAS v.3.7 software of Leica®. For scanning electron microscopy observations (SEM), one female specimen was dissected and dehydrated in a graded ethanol series (80-100 %), critical point dried, and Au-Pd coated. SEM micrographs were taken under high vacuum with a FEI XL30 TMP. All measurements are expressed in millimeters. Distances between eyes are measured edge to edge. Specimens examined were deposited in the arachnological collection of Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN-Ar, C. Scioscia & M. Ramírez).

Taxonomy

Corinnidae Karsch, 1880

Castianeirinae Reiskind, 1969

Mazax O. Pickard-Cambridge, 1898

Table 1. Comparison of the morphological characteristics of the species of *Mazax*.

Species/ characteristics	Carapace	Ventral spination (Tibia I)	Palpal tibial apophysis (♂)	Embolus	ST II & neck
M. spinosa	hairless	4–4 ♂ 5–5, 6–6 ♀	small, pointed	small, twisted	globose; short, thick neck
M. xerxes	hairless, bicolored	5–5	small, pointed	small, twisted	globose; short, thick neck
M. chickeringi	hairless	4–4	absent	small, twisted	globose; short, thin neck
M. pax	with white feathery hairs	3–3	small, pointed	small, thin, twisted	globose; short, thick neck
M. ajax	hairless	2–1	small, blunt	long, strong, straight	globose; long, thin neck
M. kaspari	hairless	3–2 ♂ 3–3 ♀	long, cusp-like	long, strong, straight, twisted	globose; short, thick neck
M. ramirezi	with white feathery hairs	4–4	absent	small, twisted	lung-shaped; short, thick neck

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Diagnosis of Genus

Mazax can be distinguished from other castianeirine genera by having a pronounced, wrinkled ("rugose") and heavily sclerotized abdominal petiole (Figs. 1A-D; 3A-B, E; 4A-B, C). At least the Asian genus *Serendib* has a somewhat similar petiole (Deeleman-Reinhold 2001), but *Serendib* species have a strongly recurved posterior eye row with widely separated eyes (slightly recurved and closer together in *Mazax*) and a globular abdomen (elongate and constricted in *Mazax*).

MAZAX RAMIREZI **SP. NOV.**
(Figs. 1-5)

Type Material

HOLOTYPE 1 female (MACN-Ar 30732; temporary preparation GDR-0254) ARGENTINA: Buenos Aires Province, Campana, Reserva Natural Otamendi (S -34° 13.649' W -58°53.916'; 22 m asl.), 27-XII-1997, B. Fuentes & O. Di Iorio coll. PARATYPES: 1 male (MACN-Ar 30733; temporary preparation GDR-0259), same locality, 10-I-1998, same collectors; 2 females (MACN-Ar 30734; temporary preparation GDR-0255/0260 [SEM samples]), 9-I-1998, B. Fuentes coll.; 1 female (MACN-Ar 30735; temporary preparation GDR-0257), 30-XII-1997, B. Fuentes & O. Di Iorio coll.; 1 female (MACN-Ar 16720; temporary preparation SAI-0027), 1997 (no specific date), O. Di Iorio coll.; 1 female (MACN-Ar 30736; temporary preparation GDR-0258), 21-II-1998, B. Fuentes coll.

Etymology

The specific name is a patronym in honor of Martín J. Ramírez, arachnologist of Museo Argentino de Ciencias Naturales "Bernardino Rivadavia".

Diagnosis

Mazax ramirezi **sp. nov**. resembles *M. pax* by having white feathery setae on the carapace (as in Fig. 1E-F), and *M. chickeringi* in its tibia I ventral spination 4-4 (plv 1-1-1-1, rlv 1-1-1-1), but can be

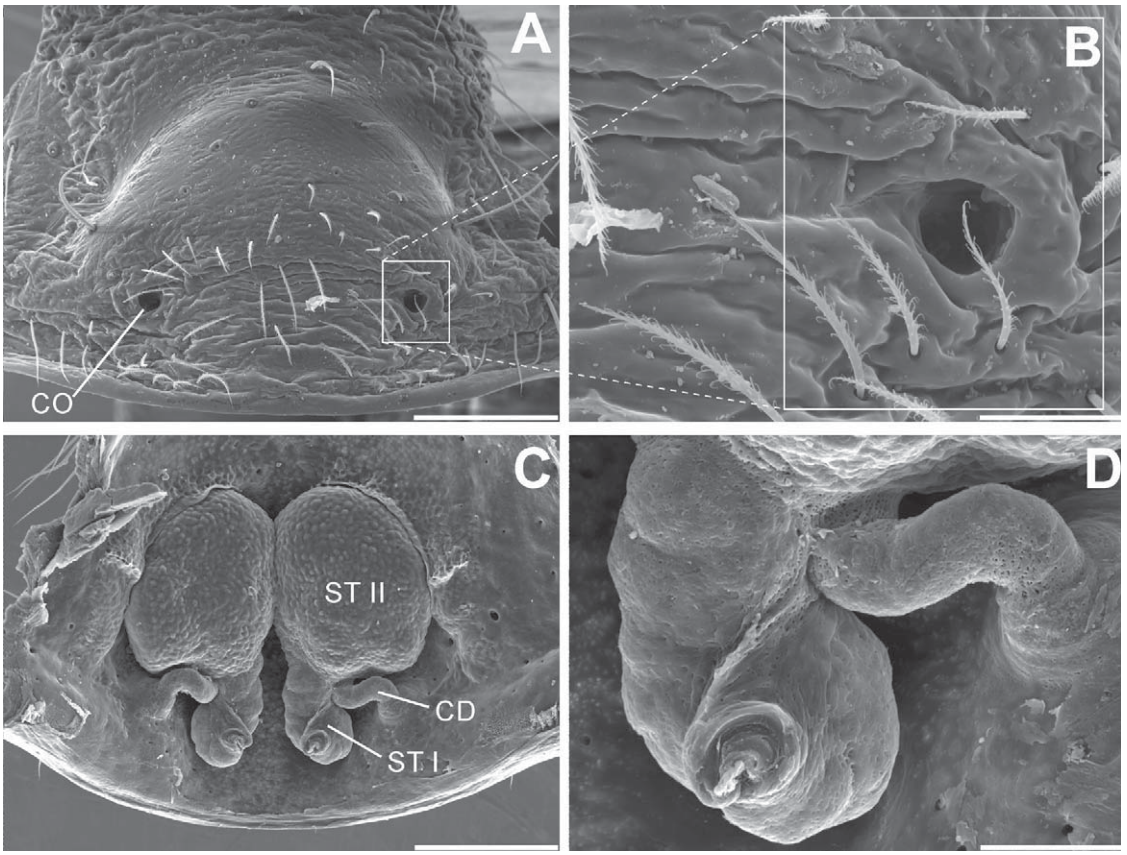


Fig. 2. SEM micrographs of female genitalia of *Mazax ramirezi* **sp. nov.** (MACN-Ar 30734). A. Epigyne ventral view; B. Close up of a copulatory opening (CO); C. Vulva, dorsal view of anterior (ST II) and posterior (ST I) spermathecae; D. Close up of a ST I and a copulatory duct (CD). Scale bars: A, C (0.2 mm); B, D (0.05 mm).

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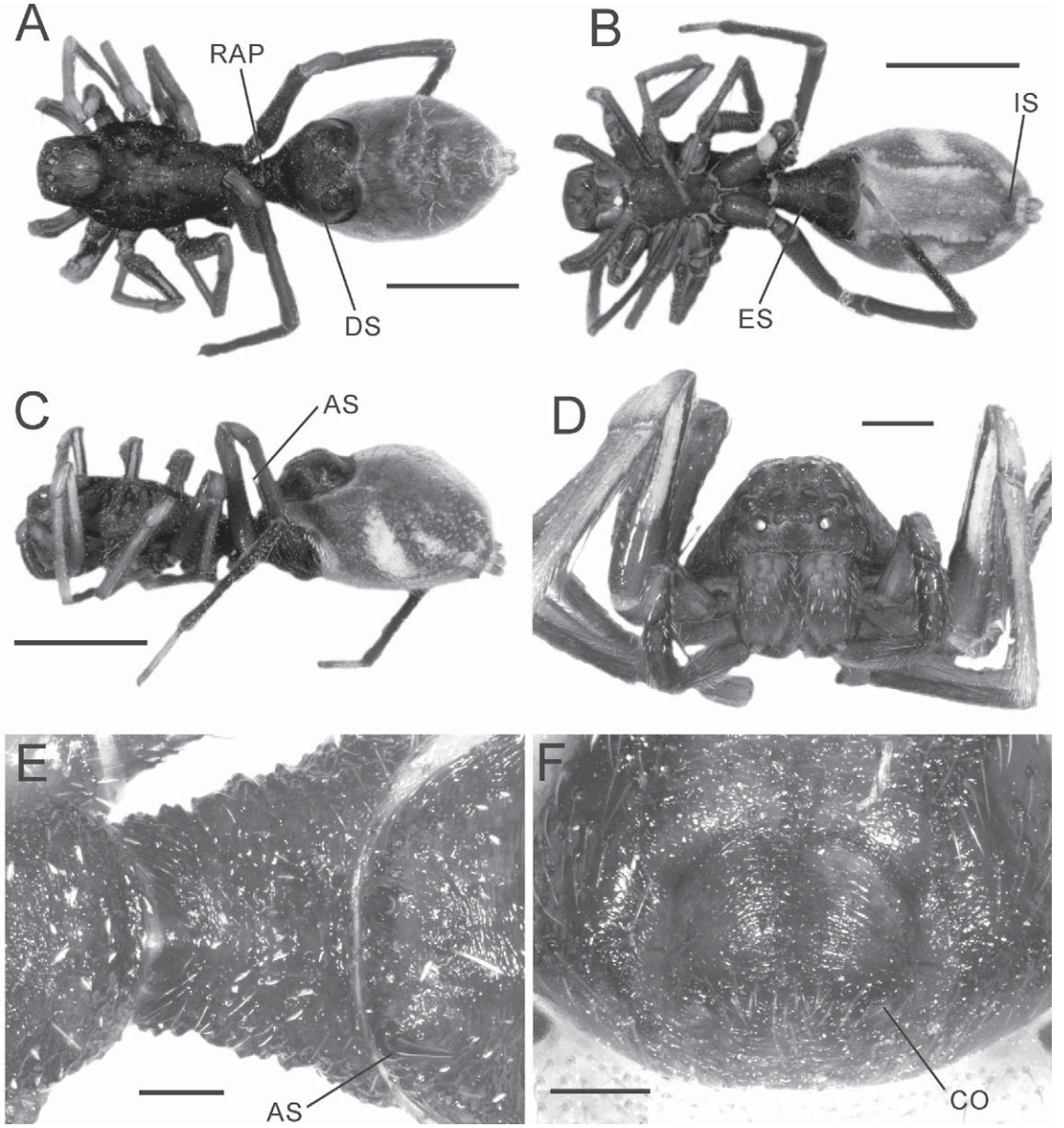


Fig. 3. Female of *Mazax ramirezi* **sp. nov.** (Paratype MACN-Ar 30736). A-D. Habitus in A: dorsal, B: ventral, C: lateral and D: frontal views; E. Rugose abdominal petiole (RAP) and abdominal setae (AS) in dorsal view; F. Epigyne ventral view. (CO = copulatory opening; DS = dorsal scutum; ES = epigastric sclerite; IS = inframamillary sclerite). Scale bars: A-C (2 mm); D (0.5 mm); E-F (0.2 mm).

distinguished from these species and all other *Mazax* in not having oval anterior spermatheca; rather, the anterior spermatheca are lung-shaped and subtriangular (Figs. 2C, 5A-B) (Table 1).

Description

Female (holotype). Measurements: CL 3.08, CW 1.68, AL 3.99, AW 2.17, TL 7.10, FL 0.24, SL 1.20, SW 0.78, AERW 0.48, PERW 0.66, AME–PME 0.13, ALE–PLE 0.16. Length of leg segments (sequence from femur to tarsus, and total): I 1.68 + 0.56 + 1.47 + 1.19 + 0.91 = 5.81; II 1.54 + 0.50 + 1.31 + 1.12 + 0.84 = 5.31; III 1.40 + 0.63 + 1.26 + 1.19 + 0.73 = 5.21; IV 2.24 + 0.70 + 2.17 + 2.10 + 1.05 = 8.26. Carapace dark orange-red with black mottling, with granulose surface and sparse white feathery setae (Fig. 3A, C); clypeus

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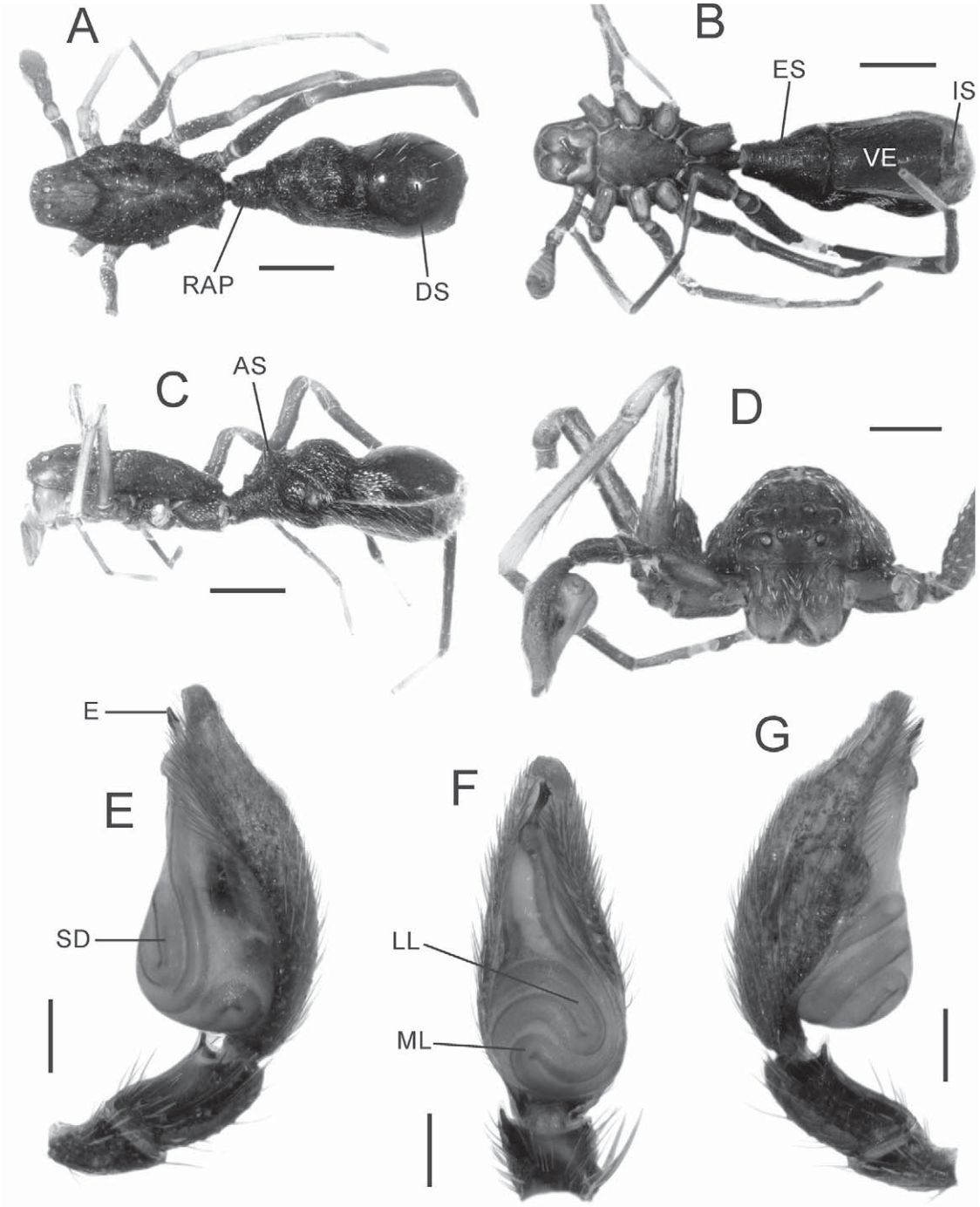


Fig. 4. Male of *Mazax ramirezi* **sp. nov.** (Paratype MACN-Ar 30733). A-D. Habitus in A: dorsal, B: ventral, C: lateral and D: frontal views; E-G. Right palp in E: prolateral, F: ventral and G: retrolateral views. (AS = abdominal setae; DS = dorsal scutum; E = embolus; ES = epigastric sclerite; IS = inframamillary sclerite; LL = lateral loop; ML = medial loop; RAP = Rugose abdominal petiole; SD = sperm ducts; VE = ventral sclerite). Scale bars: A-C (1 mm); D (0.5 mm); E-G (0.2 mm).

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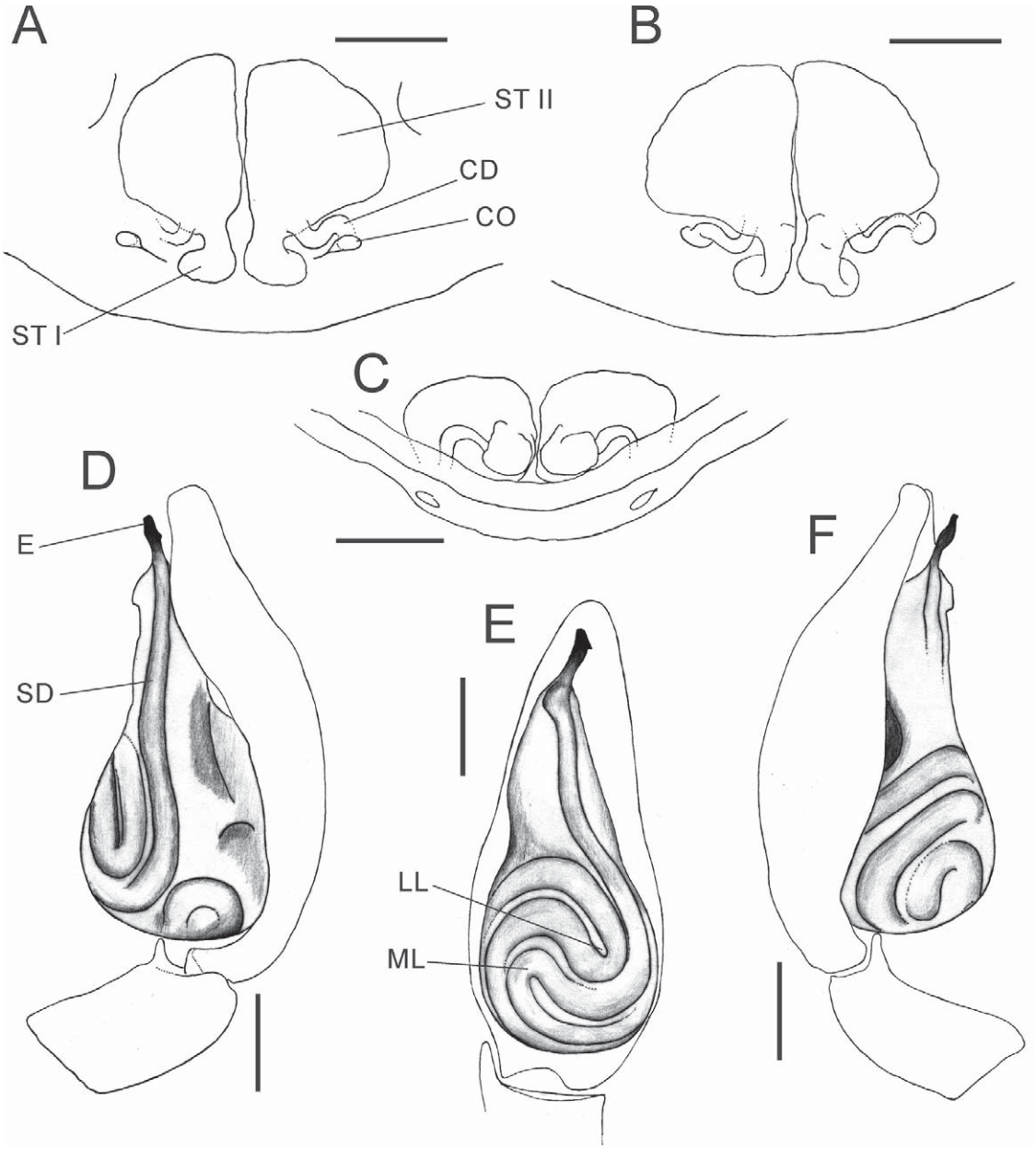


Fig. 5. *Mazax ramirezi* **sp. nov.,** drawings of genitalia. A-C. Digested epigyne in A: ventral, B: dorsal (vulva), and C: posterior views. D-F. Right palp in D: prolateral, E: ventral and F: retrolateral views. (CD = copulatory duct; CO = copulatory opening; E = embolus; LL = lateral loop; ML = medial loop; SD = sperm ducts; ST I = posterior spermathecae; ST II = anterior spermathecae). Scale bars: 0.2 mm.

dark orange-red (Fig. 3D); eyes medium, approximately equal, except AME slightly smaller than remainder, eyes with narrow dark rings; AER nearly straight, PER slightly recurved; clypeus height larger than AME diameter. Chelicerae orange-brown with faint dark mottling on anterior surface of paturon, with numerous white setae; 3 teeth on promargin, median tooth largest, proximal and distal teeth subequal, distal tooth situated closest to median tooth; 2 slightly separated subequal teeth on retromargin, closer to fang base than promarginal teeth; endites orange-red, cream prolaterally; labium orange-red, cream distally; sternum granulated, red, with faint black

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mottling (Fig. 3B). Legs granulate, orange-red, except femora I–II clear prolateral/ventrally (Fig. 3C-D); tarsi I–IV slightly lighter. Leg spination: femora: I pl 0-0-1, do 1-0, vt with longitudinal row of setae; II do 1-1, vt = I; III pl 1-1, do 1-1; IV pl 0-0-1, do 1-1-1; patellae with do 1 distal and 1 proximal bristles; tibiae: I and II plv 1-1-1-1, rlv 1-1-1-1; III pl 1-1, plv 1-1, vt 1-1, rl 1-1; IV pl 1-1, rl 1-1; vt 2-2-2; metatarsi: I plv 1-1, rlv 1-1; II = I, III pl 1-1-1, rl 1-1-0, plv 1-1-0, rlv 1-1-0; IV pl 1-1-1, rl 1-1-1, plv 1-1, rlv 1-1, vt with numerous setae longitudinally. Palpal spination: femora do 0-1-1, vt 1-1-1-1; patellae pl 1, do 1 (bristle); tibiae pl 1-1-0. Abdomen (Fig. 3A-C) dark lilac-grey, with indistinct whitish chevrons, with white and dark setae dorsally; DS dark red, quite convex, extending 1⁄3 abdomen length (Figs. 1A-B; 3A, C). Two spines on tubercles at anterior end of DS (homologous to second pair of abdominal setae) (Fig. 1A-C). Anterior petiole conspicuous, wrinkled (Figs. 1C-D; 3E); venter/laterally pale lilac with large cream mottled markings, ES (forming the petiole anteriorly) and IS dark red; VS absent (Fig. 3B). Epigyne with quite small, oval and posterolaterally placed CO (Fig. 2A-B); CD short, S-shaped (Figs. 2C-D; 5A-C); ST II large, lung-shaped/subtriangular, joined to very small posterior ST I (Figs. 2C-D; 5A-C).

Male (paratype). Measurements: CL 2.80, CW 1.50, AL 3.30, AW 1.54, TL 6.20, AERW 0.52, PERW 0.74. Length of leg segments: I 1.70 + 0.50 + 1.66 + 1.58 + 1.04 = 6.48; II 1.42 + 0.48 + 1.32 + 1.22 + 0.86 = 5.30; III 1.38 + 0.56 + 1.16 + 1.20 + 0.76 = 5.06; IV 2.18 + 0.66 + 2.14 + 2.12 + 1.02 = 8.12. Coloration and textures as in female. Chelicheral teeth, palpal and leg spination as in female. Abdomen completely covered by dark red, convex DS (Fig. 4A, C). ES and IS as in female; full VS present (Fig. 4B). Pedipalp without apophysis (Fig. 4E-G). Tarsus with globose genital bulb with short, twisted, sclerotized embolus; sperm ducts with 2 loops, ML and other LL (Figs. 4F, 5D-F).

Variation. Female (n = 6) without significant variation, some abdomens are larger than others.

Natural History. This species is an ant-mimicking spider which inhabits shrubbery of *Baccharis salicifolia* (Ruiz & Pav.) Pers. ("chilcal") (Asterales: Asteraceae). Because of their great similarity to ants, and because the spiders are found in leaf litter of chilcal, they may be generalized mimics of any myrmicine ant species. Ecological data show that this species is in its immature stages from Apr to Oct, sub-adult in Nov, and the adult spiders occur from Dec to Feb. All specimens were caught with pitfall traps.

Distribution

Presently known only from the type locality in Otamendi, Buenos Aires Province, Argentina.

KEY TO MALE AND FEMALE SPECIES OF *MAZAX* (UPDATED FROM REISKIND 1969)

1. Tibia I ventral spination 2–1, 3–2 or 3–3 2

—. Tibia I ventral spination 4–4, 5–5 or 6–6 4

2. Tibia I ventral spination 2–1; embolus long and straight, neck of spermathecae very long (Reiskind 1969, Figs. 238-239) (southern Mexico) . . . . . *M. ajax*

—. Tibia I ventral spination 3–2 or 3–3 3

3. Embolus short and twisted (Reiskind 1969, Fig. 236); tibia I ventral spination 3–3 (Mexico and Central America) . . . . . *M. pax*

—. Embolus long, straight, only twisted at the tip (Cokendolpher 1978, Fig. 4); tibia I ventral spination 3–2 in male and 3–3 in female (USA) . . . . . *M. kaspari*

4. Carapace bicolored: cephalic region yellow-orange, posterior part of thoracic region red-brown (Reiskind 1969, Fig. 280) (Costa Rica) . . . . . *M. xerxes*

—. Carapace not bicolored, uniform 5

5. Male with palpal tibial apophysis; tibia I ventral spination of female 5–5 or 6–6 (Central America, Lesser Antilles) . . . . . *M. spinosa*

—. Palpal tibial apophysis absent; tibia I ventral spination 4–4 6

6. Carapace hairless; ST II globose, ST I as thick as the neck (Reiskind 1969, Fig. 222) (Jamaica) . . . . . *M. chickeringi*

—. Carapace with white feathery setae (as in Figs. 1E-F; 3A-C); ST II lung-shaped, ST I thicker than the neck (Figs. 2C-D; 5A-B) (Argentina) . . . . . *M. ramirezi* **sp. nov.**

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