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Description of the female of *Lyssomanes miniaceus*, with a new distribution record for *L. belgranoi* (Araneae: Salticidae)

Descripción de la hembra de *Lyssomanes miniaceus*, con un nuevo registro de distribución para *L. belgranoi* (Araneae: Salticidae)

Gonzalo D. Rubio
CONICET, Estación Experimental Agropecuaria Cerro Azul (EEA Cerro Azul, INTA), Cerro Azul, Misiones, Argentina. grubio@conicet.gov.ar

William Galvis
Laboratorio de Aracnología & Miriapodología (LAM-UN), Instituto de Ciencias Naturales, Departamento de Biología, Universidad Nacional de Colombia, Sede Bogotá, Colombia. wlgalvisj@unal.edu.co

María F. Nadal
Laboratorio de Biología de los Artrópodos, Universidad Nacional del Nordeste (FaCENA-UNNE), Corrientes, Argentina. florencia.nadal@gmail.com

ABSTRACT
Numerous new spider species are waiting to be described, and in many cases knowledge is incomplete because species are known from a single sex. In this contribution the female of the jumping spider *Lyssomanes miniaceus* is described and its morphology is illustrated. Females are distinguished by having spherical, slightly oval spermathecae, the copulatory openings towards the back, and sparse white hairs ventrally on femora I and II; the last character could be a unique trait shared by both sexes. Additionally, a new southernmost record plus new illustration of the little-known species *L. belgranoi* are given.

Key words. Argentina, jumping spider, taxonomy.

RESUMEN
Gran número de especies nuevas de arañas están a la espera de ser descritas, y en muchos casos el conocimiento es incompleto porque se conoce un solo sexo. En esta contribución, la hembra de la araña saltadora *Lyssomanes miniaseus* es descrita y por primera vez se ilustra su morfología. La hembra se distingue por tener las espermatecas esféricas, ligeramente ovales, una posición atrasada de los orificios copulatorios, y pelos blancos esparcidos ventralmente sobre los fémures I y II; podría ser este último carácter una característica compartida por ambos sexos potencialmente única a esta especie. Adicionalmente, se presenta aquí un nuevo registro más al sur y una nueva ilustración de la especie poco conocida *L. belgranoi*.

Palabras clave. Argentina, araña saltadora, taxonomía.

INTRODUCTION

In Prószyński's Global Species Database of Salticidae (Prószyński c2016), accepted species status means that both sexes have been adequately described and illustrated, while incomplete is due to the description and illustration of only one sex. Salticids constitute the largest family of spiders (WSC c2016), and one apparent problem is that this diversity may be somewhat inflated due to lack of matching of single sex known species (Edwards 2014). However, this argument ignores large amounts of new species, many with both sexes available, waiting to be described.

The American *Lyssomanes* is one of the most speciose genus of jumping spiders, including 91 valid species distributed mainly in the tropical forests of the Amazonian region (WSC c2016, Galvis 2017). Ten species of this genus inhabit Argentina (*L. austerus* Peckham, Peckham & Wheeler, 1889; *L. belgranoi* Galiano, 1984; *L. hieroglyphicus* Mello-Leitão, 1944; *L. leucomelas* Mello-Leitão, 1917; *L. miniaceus* Peckham, Peckham & Wheeler, 1889; *L. nigrofimbriatus* Mello-Leitão, 1941; *L. pauper* Mello-Leitão, 1945; *L. penicillatus* Mello-Leitão, 1927; *L. tristis* Peckham, Peckham & Wheeler, 1899; *L. yacui* Galiano, 1984), and all of them were found in the Misiones province except the dubious *L. hieroglyphicus* (Galiano 1980, Galvis and Rubio 2016). The southernmost species record is *L. pauper* in Córdoba and Buenos Aires (Galvis and Rubio 2016).

The latest larger paper on the genus *Lyssomanes*, describing several new species of Central and South America (Logunov 2014), has achieved an adequate framework for subsequent alpha taxonomic works, and allows to complete the knowledge about such incomplete species status *sensu* Prószyński (c2016). Thus, in this paper the female of *L. miniaceus* is described and its somatic and genital morphology is illustrated, additionally a new southernmost record plus new illustration of the rare species *L. belgranoi* are given.

MATERIALS AND METHODS

A number of sources were used for this contribution; eight arachnological collections with specimens and records of ten different species of *Lyssomanes* were revised: Sección de Entomología de la Facultad de Ciencias, Universidad de la República, Montevideo, Uruguay (FCE–Ar, M. Simó and F. Pérez-Miles); Fundação Zoobotánica do Rio Grande do Sul, Museu de Ciencias Naturais, Porto Alegre, Brazil (FZB, R. Ott); Instituto de Biología Subtropical, Misiones, Argentina (IBSI–Ara, G. Rubio); Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, Colombia (ICN–Ar, E. Flórez); Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina (MACN, C.L Scioscia and M. Ramírez); Museu de Ciencias e Tecnologia, Pontificia Universidade Católica, Porto Alegre, Brazil (MCTP, A.A. Lise); Museo de La Plata, Argentina (MLP, L.A. Pereira); Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil (MZSP, R. Pinto-da-Rocha). Besides that, in latest surveys of the salticid fauna from Northeastern Argentina, specimens of both sexes of *L. miniaceus* were observed and collected together, plus a female of *L. belgranoi*. Specimens examined were deposited in IBSI-Ara and MACN.

Description formats and morphological terms follow Rubio *et al.* (2015) and Zhang and Maddison (2015). Female genitalia were dissected as in Levi (1965), examined after digestion in hot ~15% KOH

solution (Ramírez 2014) and clarified in clove oil to study the internal structures. Temporary preparations were examined and photographed using a Leica DM500 compound microscope and a Leica M60 stereomicroscope. Drawings of male palp in Figure 1 were modified following original sources (Logunov 2014), plus examining specimens under the stereomicroscope in the case of *L. belgranoi* following Galiano (1984). Photographs in nature were taken with a Nikon D80 digital camera using a Micro-Nikkor 85 mm lens. All measurements were made with an ocular micrometer in millimeters, and were obtained as in Galiano (1963). Abbreviations used in the text and figures are: ALE—anterior lateral eye; AME—anterior median eye; CD—copulatory duct; CO—copulatory opening; E—embolus; FD—fertilization duct; MA—median apophysis; MAp—retrolateral projection on MA; PLE—posterior lateral eye; PME—posterior median eye; PT—promarginal teeth; RT—retromarginal teeth; S—spermatheca.

RESULTS

Taxonomy

Salticidae Blackwall, 1841

Lyssomaninae Peckham, Peckham & Wheeler, 1889

***Lyssomanes* Hentz, 1845**

Diagnosis. *Lyssomanes* (completes with *Chinoscopus* and *Sumakuru* the genera included in the lyssomanines) can be distinguished from *Chinoscopus* by the third row of eyes that is much narrower than the fourth row, and from *Sumakuru* by the different disposition of sexual characters of the male palp and general somatic features (see details in Galvis 2017).

***Lyssomanes miniaceus* Peckham, Peckham & Wheeler, 1889**
Figs. 1, 2a-f, 3a-c; e-h

Lyssomanes miniaceus Peckham, Peckham & Wheeler, 1889: 227, 230, pl. 11, fig 6 (male lectotype and four male paralectotypes from Brazil, Rio de Janeiro, Tijuca, Therezopolis, deposited in MNHN—Muséum National d´Histoire Naturelle de París, France, not examined); Simon 1901: 392, 396; Mello-Leitão 1943: 221; Galiano 1962: 68, pl. 5, figs 6-9 (redescription of the male paralectotype); Galiano 1980: 18, map 4; Buckup *et al.* 2010: 500; Logunov 2014: 74, figs 15-18; Rubio 2014: 3, fig 2a-d; CAA 2016; WSC 2016.

Diagnosis. Males of *Lyssomanes miniaceus* can be distinguished from other *Lyssomanes* by having a very developed median apophysis (MA) with a large retrolateral projection (MAp) that resembles a horseshoe (Fig. 1), and red coloration on patella and tibia of legs I and II; females differ from those of other congeners by the following combination of characters: spherical/slightly oval spermathecae (S), copulatory openings (CO) emerging at the posterior edge of S in a shallow concavity (Fig. 2c-e), and white sparse hairs ventrally on femora I and II (Figs. 2a, b).

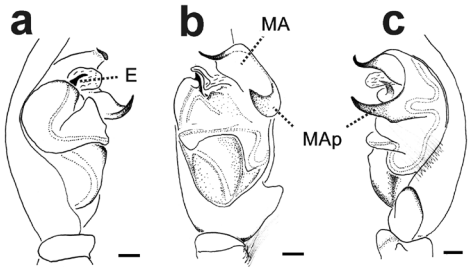

Figure 1. *Lyssomanes miniaceus* Peckham, Peckham & Wheeler. **a.** Male left palp, prolateral view; **b.** same, ventral; **c.** same, retrolateral view. E= embolus; MA= median apophysis; MAp= retrolateral projection on MA. Scale bar = 0.2mm.

Material examined. ARGENTINA. **Misiones:** one male, Cataratas del Iguazú, Nov 1954, *Schiapeli, De Carlo*, MACN 5694; one male, General Belgrano, Dec 1972, *M.E. Galiano*, MACN; two males, one female, General Manuel Belgrano, Urugua-í Wildlife Reserve, 25°58'27.64" S, 54°6'58.79" W, 293 masl, 5 Nov 2013, *G.D. Rubio, C.I. Argañaraz*, IBSI-Ara 0090, tissue sample GDR 4099; two males, same data, 26 Nov 2014, IBSI-Ara 00462–00463; one male, Parque Nacional Iguazú, Oct 1971, *M.E. Galiano*, MACN; one male, same locality, 23–29 Nov 1981, *P. Goloboff*, MACN; one male, same locality, 11–17 Nov 1984, *C.L. Scioscia*, MACN; one male, same locality, Nov 1987, *C.L. Scioscia*, MACN; one male, same locality, Dec 1987, *C.L. Scioscia*,

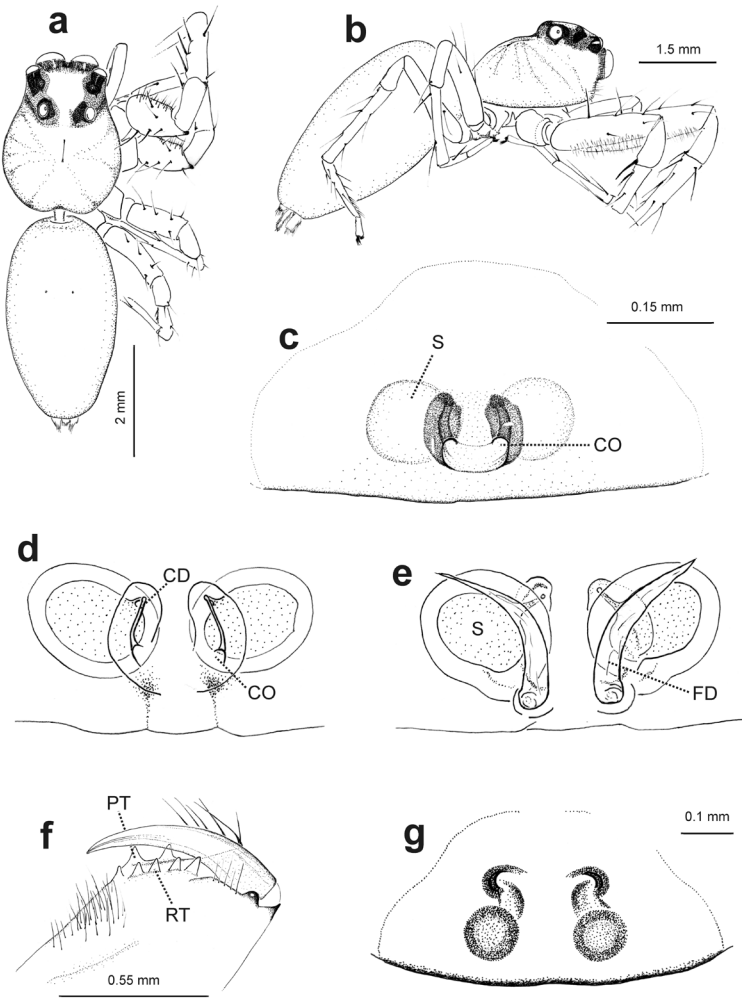

Figure 2. a-f. *Lyssomanes miniaceus* Peckham, Peckham & Wheeler, **g.** *Lyssomanes belgranoi* Galiano. **a.** Female, dorsal habitus, **b.** same, lateral habitus, **c.** epigyne, ventral view, **d.** same, cleared, **e.** same, dorsal view, **f.** left chelicera, posterior view, **g.** epigyne, ventral view. CD= copulatory duct, CO= copulatory opening, FD= fertilization duct, PT= promarginal teeth, RT= retromarginal teeth, S= spermatheca.

MACN; one male, Rio Uruguai, *Pantridge*, MACN; one male, San Antonio, Nov 1954, *Schiapeli, De Carlo*, homeotype MACN 5098; one male, Yacui, Nov 1970, *M.E. Galiano*, MACN. BRAZIL. **Rio Grande do Sul:** one male, Campo Bom, 16 Nov 1979, *C.J. Becker*, FZB 8788; two males, one female, Derrubadas, Parque Estadual do Turvo, 28–31 Oct 2003, *R. Ott*, FZB 37448; one male, one female, two immatures, Triunfo, 15 Sep 1977, *E.M. Buckup*, FZB 6502.

Description. Male (Lectotype, MNHN) is well illustrated and described in previous contributions: see Galiano (1962: 68, plate V, figs 6-9) and illustration in Logunov (2014, figs 15-17). Left palp and habitus as in Figures 1 and 3e, f respectively.

Female (IBSI-Ara 0090, Figs. 2a-f, 3a-c, g, h). Total length: 7.20. Carapace 2.60 long, 2.25 wide, 1.44 high; abdomen 3.90 long, 2.10 wide. Eye sizes: AME 0.61, ALE 0.32, PME 0.05, PLE 0.27. Ocular quadrangle 1.06 long. Anterior eye row 1.52 wide, posterior 1.12 wide. Clypeus height 0.30. Cephalic region high, thoracic region down sloping (Fig. 2b). Chelicerae with two moderately large promarginal teeth, and five retromarginal teeth, the proximal smaller than the others (Fig. 2f). Sternum slightly longer (1.20) than wide (1.12). Leg measurements [total leg (femur, patella, tibia, metatarsus, tarsus)]: I 9.40 (2.75, 1.17, 2.60, 2.28, 0.60); II 8.02 (2.40, 1.08, 2.20, 1.75, 0.59); III 7.72 (2.28, 0.92, 1.72, 2.10, 0.70); IV 7.79 (2.24, 0.82, 1.80, 2.28, 0.65). Abdomen oval, dorsal abdominal scutum absent (Figs. 2a, 3g). Coloration (in alcohol): Carapace yellow; cephalic region pale yellow, with black patches around the ALEs, PMEs and PLEs (Figs. 2a, b); ocular quadrangle covered by white hairs inwards and reddish hairs to outside of the area. Thoracic region yellow. Chelicerae pale yellow. Legs pale yellow, slightly darker on the distal ends. Femora I and II with white sparse hairs throughout the ventral area (Figs. 2a, b). Sternum and labium pale yellow. Abdomen pale yellow, with sparse small light brown hairs. Spinnerets pale yellow. Epigyne: epigynal plate small, thin and translucent, wider than long (Figs. 2c, 3a); two small copulatory openings (CO), emerging in a very shallow concavity (Fig. 2c). Each CO has a narrow slightly sclerotized rim, anteroectally. Copulatory ducts short, directed forward, connecting to a spherical/slightly oval spermatheca (Figs. 2d, 3a-c). Accessory gland absents. Fertilization duct large, posterior to spermathecae, located dorsally (Figs. 2e, 3c).

Sexual dimorphism. Male and female differ slightly in their size and somatic morphology, females are slightly larger than males, mainly due to their larger abdomen (Fig. 3e-h). Some males are more pigmented than females, e.g. brown spot on thoracic region and red coloration on femur, patella and tibia of legs I and II. Regarding setae, two characteristics are markedly different: males have black thick setae covering all legs, and a dense patch of white hairs ventrally on femora I and II (Fig. 3f). Females have such white hairs, but less dense.

Comments. The presence of white hairs throughout the ventral area of femora I and II could be an intersexual shared autapomorphy (see Edwards 2014), it is supported by geographic and phenological evidence.

Natural history. In the Urugua-í Wildlife Reserve, specimens were collected using Garden-Vacuum on foliage of rainforest vegetation, where they share the habitat with other species of *Lyssomanes* (*L. leucomelas* Mello-Leitão, 1917, *L. nigrofimbriatus* Mello-Leitão, 1941 and *L. pauper*). This area corresponds to subtropical rainforests in the Upper Parana Atlantic Forest Eco-region (Olson *et al*. 2001). This species is found between 4–993 masl.

Distribution. Brasil (Minas Gerais, Rio de Janeiro, São Paulo, Rio Grande do Sul) and Argentina (Misiones).

***Lyssomanes belgranoi* Galiano, 1984**
Figs. 2g, 3d

Lyssomanes belgranoi Galiano, 1984: 274, figs 17-19, 31-32 (male holotype and female paratype from Argentina, Misiones, San Antonio, deposited in MACN 7725 and 7726 respectively, not examined); Rubio 2014: 3; CAA 2016; Galvis and Rubio 2016: 20, fig 1B; WSC 2016.

Material examined. ARGENTINA. **Corrientes:** one female, Paraje Tres Cerros, 29°6'34.30" S, 56°55'51.92" W, 163 masl, 21 Feb 2015, *G. Avalos*, IBSI-Ara 0789, tissue sample GDR 4195.

Note. For diagnosis, description and further taxonomic information see Galiano (1984: 274, figs 17-19, 31-32). Epigyne as in Figs. 2g, 3d.

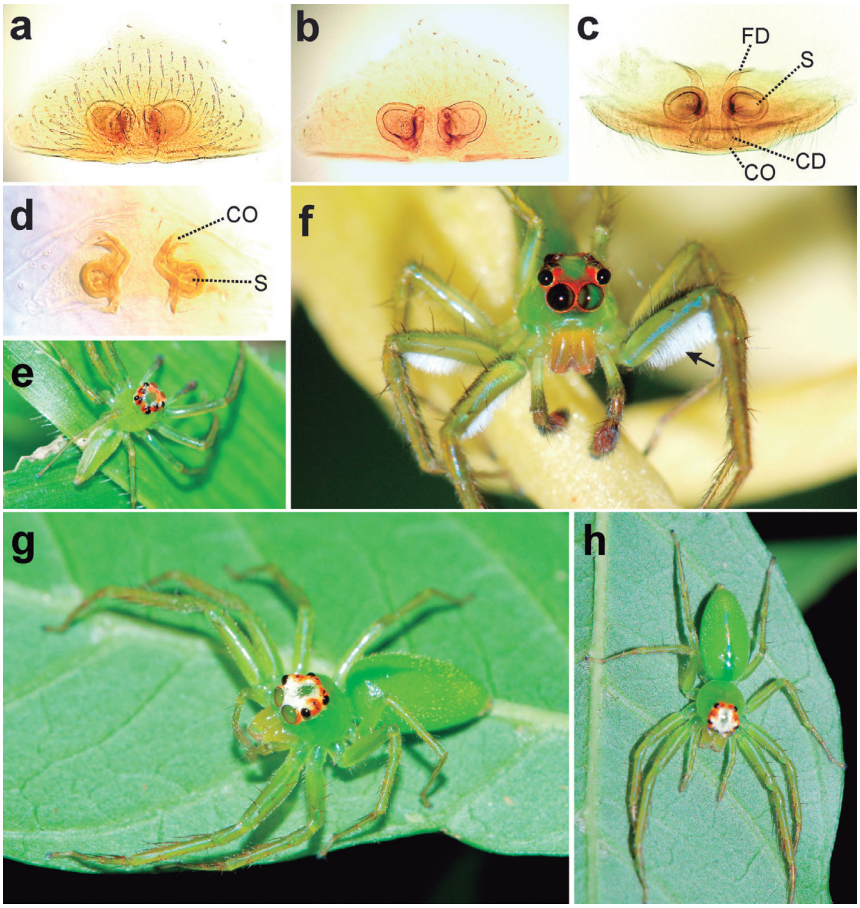

Figure 3. **a-c, e-h.** *Lyssomanes miniaceus* Peckham, Peckham & Wheeler, **d.** *Lyssomanes belgranoi* Galiano. Cleared epigyne in **a.** ventral, **b.** dorsal and **c.** anterior view. Habitus of living specimens from Urugua-í Wildlife Reserve: **e**, **f.** male, **g**, **h.** female. **d.** Cleared epigyne in ventral view. The arrow indicates the white hairs.

Distribution and remarks. Argentina (Misiones, Corrientes). Known altitudinal distribution: 163–520 m. New records from the Paraje Tres Cerros in the Eastern Corrientes (Argentina). The last record of this species was in December 1972 (Galiano 1984); this is the fourth specimen found.

AUTHORS PARTICIPATION

GDR examination of specimens, description, illustrations, paper writing; WG examination of specimens, paper writing; MFN examination of specimens, paper writing.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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