Zootaxa 3104: 52–58 (2011)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

The spider *Micrathena shealsi* Chickering, 1960 (Araneae, Araneidae): description of the male, with new data on its geographic distribution

CARINA I. ARGAÑARAZ[1] & GONZALO D. RUBIO[1,2]

[1]*Cátedra de Diversidad Animal I. Facultad de Ciencias Exactas, Físicas y Naturales. Universidad Nacional de Córdoba. Av. Vélez Sarsfield 299, X5000JJC Córdoba, Argentina. E-mail: c.arg.bio@gmail.com*
[2]*División Aracnología. Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN-Ar, CONICET). Av. Ángel Gallardo 470, C1405DJR Buenos Aires, Argentina. E-mail: grubio@conicet.gov.ar*

Abstract

The male of *Micrathena shealsi* Chickering, 1960 is described and illustrated for the first time. New geographic records of this species are provided, revealing that *M. shealsi* inhabits the higher altitudinal belts (1000–3000 m) of the Yungas ecoregion (mountain forests and rainforests from Argentina). Male specimens were observed in the same web of females, in most cases on the upper periphery hanging by a silk line.

Key words: Argentina,orb-weaver spider, spider taxonomy, Yungas ecoregion

Introduction

The spider genus *Micrathena* Sundevall, 1833 (Araneaidae) comprises 106 species most of them occurring in the Neotropical region (only a few species extend their ranges into the Nearctic region,like *M. funebris* (Marx 1898), *M. gracilis* (Walckenaer 1805), *M. mitrata* (Hentz 1850), and *M. sagittata* (Walckenaer 1841) (Levi 1985; Platnick 2011). *Micrathena* species have diurnals habits; females build a vertical web in the morning (Levi 1985). They can be easily recognized by their spiny abdomen, the vertical orb-webs with an open hub and their characteristic upside-down position on the webs, with the abdomen inclined horizontally (Gonzaga & Santos 2004). This position with abdomen parallel to the ground is made possible by the unusually long fourth femora (Levi 1985).

Micrathena species exhibit strong sexual dimorphism, females tending to a high degree of abdominal spination involving many different patterns (either projected laterally and/or posteriorly; spines can be simple, lobulated of forked, generally bright and colorful). The evolutionary meaning of these spines is still unclear, perhaps representing a defense against natural predators such as wasps, dragonflies, birds, or lizards (Levi 1985). Adult males, on the other hand, usually lack definite spines, show much less gaudy coloration, are much smaller, with abdomen square to rectangular (Chickering 1961; Sabogal & Floréz 2000). In some species the dimorphism is so marked that males mimic ants.

This high degree of sexual dimorphism has hindered the matching of adult males with the corresponding females (Chickering 1961). Moreover, *Micrathena* males are seldom collected together with females, since they are rarely found in the webs of females (Levi 1985). Males are relatively rare in collections, being therefore very poorly known. Correct matching with females is possible in a comparatively few cases (Chickering 1960b, 1961). Fieldwork can be helpful to overcome the problem. As a result of an ecological study in Argentinean rainforests by the second author, specimens of both sexes of *M. shealsi* were repeatedly observed and collected in the same web. Our paper provides direct evidence to the conspecificity of the described males and females of this species.

The last extensive taxonomic revision of *Micrathena* was published by Herbert W. Levi (1985) and still stands as the primary monograph for the genus. Thereafter, only four studies were added taxonomic information to Levi's revision (Bonaldo 1990; Lise 1995; Gonzaga & Santos 2004; Magalhães & Santos 2011). According to features of the genitalia, the abdomen and the form of carapace, the genus *Micrathena* was split in eight groups (Levi 1985). *Micrathena shealsi* Chickering, 1960 belongs to the *guerini* species group, in which males always have a hook on

 Accepted by G. Hormiga: 11 Oct. 2011; published: 21 Nov. 2011

the first coxa, fitting into a groove on the dorsum of the proximal end of the second femur (Levi 1985). The coxal hook is found in males of the *kirbyi* group too (Levi 1985).

In this study, the male of *M. shealsi* is described for the first time, and its somatic and palpal morphology illustrated. In addition, new geographic records for this species are provided. The only previous record of *M. shealsi* was from "Sunchal, Argentina", without further information given on the specimen label (Chickering 1960a); Levi (1985) assumed that this locality might be placed in Salta Province.

Methods

Specimens were collected in two areas of the central region of the Salta Province, using the Garden-Vacuum method to collect spiders on vegetation (Rubio & González 2010). Additional samples were obtained by manual collecting in four sites of the Jujuy and Tucumán Provinces, Argentina. All study sites are rainforests, and correspond to the Yungas ecoregion (Brown *et al.* 2006). In total 14 distribution records were available and arranged though a geographic information system to build the map (DIVA-GIS 5.4, Hijmans *et al.* 2005).

Morphological terms and format of taxonomic description follow mostly Levi (1985). Male palps were expanded with KOH solution and observed with compound microscope. Photographs of the preserved specimens were taken with a Leica® DFC295 digital camera attached to a Leica® M205A stereomicroscope, and the focal planes were composed with LAS v.3.7 software of Leica®. Illustrations were made on photograph models obtained and using the stereomicroscope. Photographs in nature were taken with a Nikon® D80 digital camera using a Micro-Nikkor 85mm lens. All measurements are expressed in millimeters. Specimens examined were deposited in the following Argentinean institutions (abbreviations and curators in parentheses): Instituto para el Estudio de la Biodiversidad de Invertebrados, Universidad Nacional de Salta (IEBI, J.A. Corronca) and Colección Nacional Aracnológica, Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN-Ar, C. Scioscia & M. Ramírez).

Taxonomy

Araneidae Simon, 1895

Micrathena Sundevall, 1833

Micrathena shealsi Chickering, 1960

(Figs. 1–18; Map 19)

Micrathena shealsi Chickering, 1960a: 8, figs. 13–17 (Holotype female from Sunchal, Argentina, deposited in Invertebrate Zoology Collection of Museum Comparative Zoology—MCZ 23053, not examined).
Micrathena shealsi: Levi, 1985: 458, figs. 74–78; Platnick, 2011.

New records. ARGENTINA: **Jujuy**: Yala (24º07'13"S, 65º27'24"W, 1888m.a.s.l.), 20 May 1983 (P. Goloboff), 1 female (MACN-Ar 25178); Calilegua, Parque Nacional Calilegua, Seccional Aguas Negras (23º45'43.3"S, 64º51'04.7"W, 605m.a.s.l.), 27–31 January 2009 (M. Izquierdo, L. Zapata & M. Akmentis), 1 male (MACN-Ar 27850); same loc., near Monolito (23º40'27"S, 64º54'01"W, 1714m.a.s.l.), 19 October 2009 (G. Rubio & M. Pocco), 1 female (MACN-Ar 27851). **Salta**: Quebrada de San Lorenzo, site 1 (24°42'51.84"S, 65°31'6.96"W, 1833m.a.s.l.), 26–28 April 2006 (G. Rubio, J. Corronca, B. Cava, V. Olivo & A. González-Reyes), 2 females (MACN-Ar 27852); same loc., site 2 (24°43'9.60"S, 65°30'56.40"W, 1691m.a.s.l.), same date (same leg.), 6 specimens (IEBI); same loc., site 3 (24°43'16.80"S, 65°30'39.00"W, 1587m.a.s.l.), same date (same leg.), 1 specimen (IEBI); same loc., site 4 (24°43'17.04"S, 65°30'25.80"W, 1575m.a.s.l.), same date (same leg.), 2 specimens (IEBI); same loc., site 5 (24°43'16.32"S, 65°30'7.92"W, 1560m.a.s.l.), same date (same leg.), 7 specimens (IEBI); road to El Carmen, site 1 (24°31'13.36"S, 65°21'4.02"W, 1547m.a.s.l.), same date (same leg.), 2 specimens (IEBI); same loc., site 2 (24°30'33.30"S, 65°20'27.13"W, 1587m.a.s.l.), same date (same leg.), 1 specimen (IEBI); same loc., site 3 (24°30'15.84"S, 65°20'11.40"W, 1516m.a.s.l.), same date (same leg.), 2 specimens (IEBI). **Tucumán**: Cochuna (27°19'19.97"S, 65°55'38.01"W, 1162m.a.s.l.), 25 March 2011 (C. Argañaraz), 1 male (MACN-Ar 27853); same

loc., 09 April 2011 (C. Argañaraz & G. Rubio), 4 males, 6 females (MACN-Ar 27854), and 1 male (MACN-Ar 27856); monument to El Indio (27° 2'54.24"S, 65°40'8.76"W, 1065m.a.s.l.), 21 February 2011 (G. Rubio & L. Acosta), 1 sub-adult male (MACN-Ar 27855).

Diagnosis. Males of *M. shealsi* (Figs. 1–7, 9–15) resembles *M. bifida* (Taczanowski) from Peru by general habitus, and by the palp bearing a tegulum lobe in ectal view (Levi 1985: figs. 45, 47) but it can be distinguished from it by the palpal morphology (Figs. 5–7, 9–13) (*M. shealsi* has a distinctive shape of the median and terminal apophyses, Fig. 6, 10). Females of *M. shealsi* differ from congeners by the absence of a scape on the epigynum (Fig. 16) and by the ventral coloration (light sternum, and depigmented median area of the abdomen venter: Levi 1985). *Micrathena shealsi* was erroneously taken as "*M. nigrichelis* with scape of epigynum torn off" (Levi 1985). However, these species can be easily separated by the above-mentioned chromatic pattern (Levi 1985), and by the dimensions of the cephalic region (smaller in *M. shealsi*); the latter feature is also present in males.

Description. *Male* from Cochuna, Tucumán (MACN-Ar 27856): Carapace orange (in nature—Fig. 18) or yellowish (in alcohol), black on sides and with a blackish longitudinal strip starting near the posterior eyes towards thoracic groove (Figs. 1, 18). Very shallow dimples on each side of thoracic groove. Chelicerae pale yellow. Sternum and coxae light yellow, with dark pigment near the articulation. Legs orange-brown, first pair darker. Coxa I with hook, femur II with groove (Figs. 14–15). Tibia I-II with macrosetae; ventral side of femur II with row of 8–9 spines. Abdomen longer than wide, rectangle-shaped, without humps; yellowish-white dorsally (slightly orange in nature) with three black marks on each side, one dark median longitudinal strip on posterior two thirds; end of abdomen black; venter between epigastric furrow and spinnerets pale yellow, spinnerets and the rest of venter black-grayish (Fig. 3). Palp with reddish-brown general color (Figs. 17–18). Body total length from AME to tip of abdomen 5.51; carapace length 2.10, width 1.47; sternum length 0.91, width 0.52; abdomen length 3.57, width 0.98. Leg formula I/IV/II/III. Leg lengths (I/II/III/IV): femur 2.03/1.78/1.12/2.17; patella 0.64/0.58/0.38/0.49; tibia 1.54/1.22/0.63/1.20; metatarsus 1.15/1.12/0.56/1.33; tarsus 0.63/0.63/0.35/0.66; total leg 5.99/5.33/3.04/5.85.
Female (Holotype, MCZ 23053): See Chickering (1960a: 8, figs. 13–17). Internal genitalia as in figure 8.

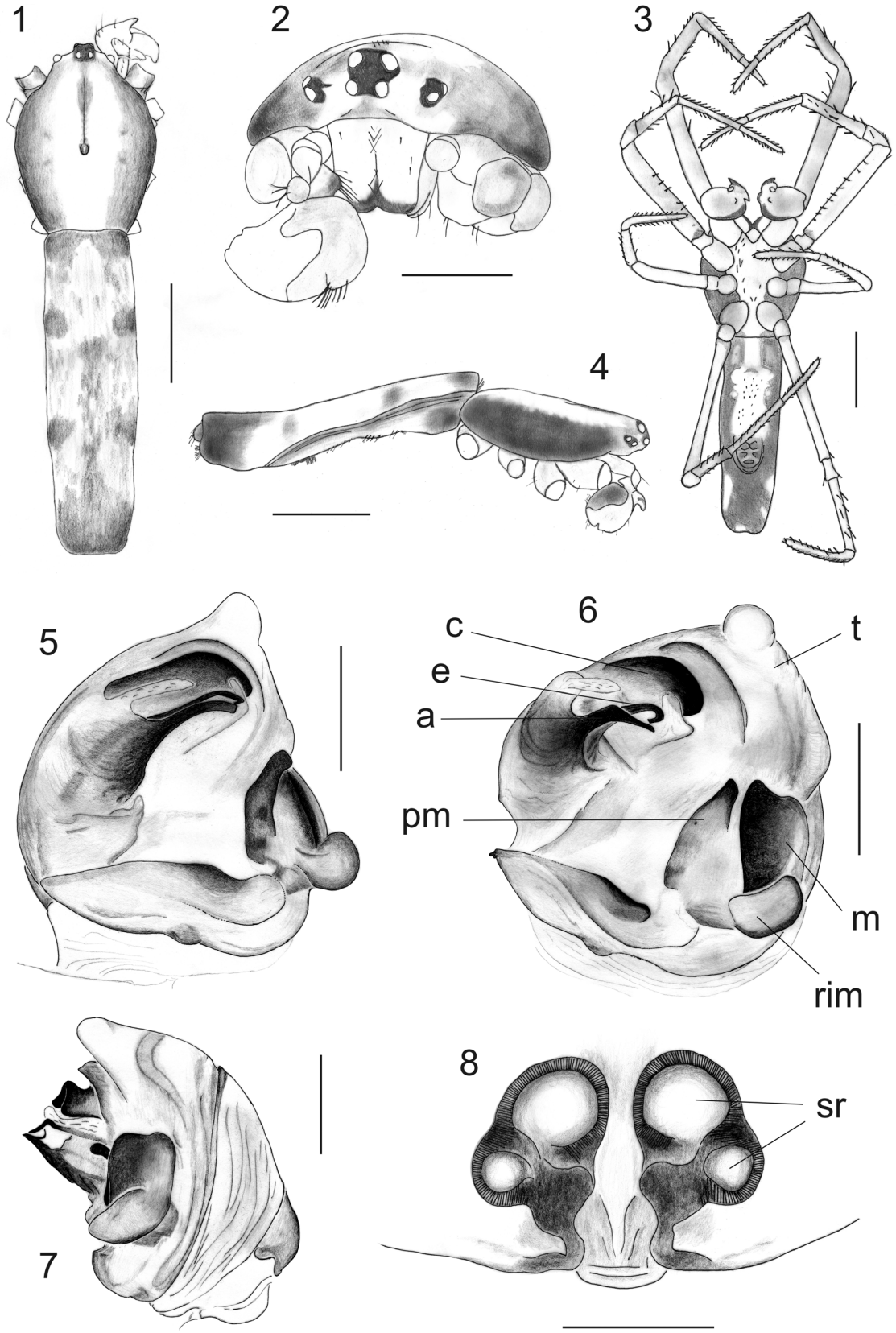
Variation. *Males* (n=6): Body total length 4.83–5.51; carapace length 2.03–2.17, width 1.4–1.5; sternum width 0.50–0.56; abdomen length 3.01–3.57, width 0.87–1.05. Total leg (I/II/III/IV) 5.98–6.12/5.28–5.37/3.01–3.11/5.85–6.04.

Natural history (Figs. 17–18). Males of *M. shealsi* were found in most cases on the upper periphery of the female webs, hanging from a silk line. In only one case, a male was found in a small orb-web located under the female site. Females of *M. shealsi* sometimes build their web near other female webs, forming groups (of 2 to 5 individuals) in the lower stratum of vegetation, no higher than 60 cm. In such cases males were not observed. Ongoing ecological research (G. D. Rubio, unpublished) suggests that this species is strongly associated with the Yungas rainforest habitat.

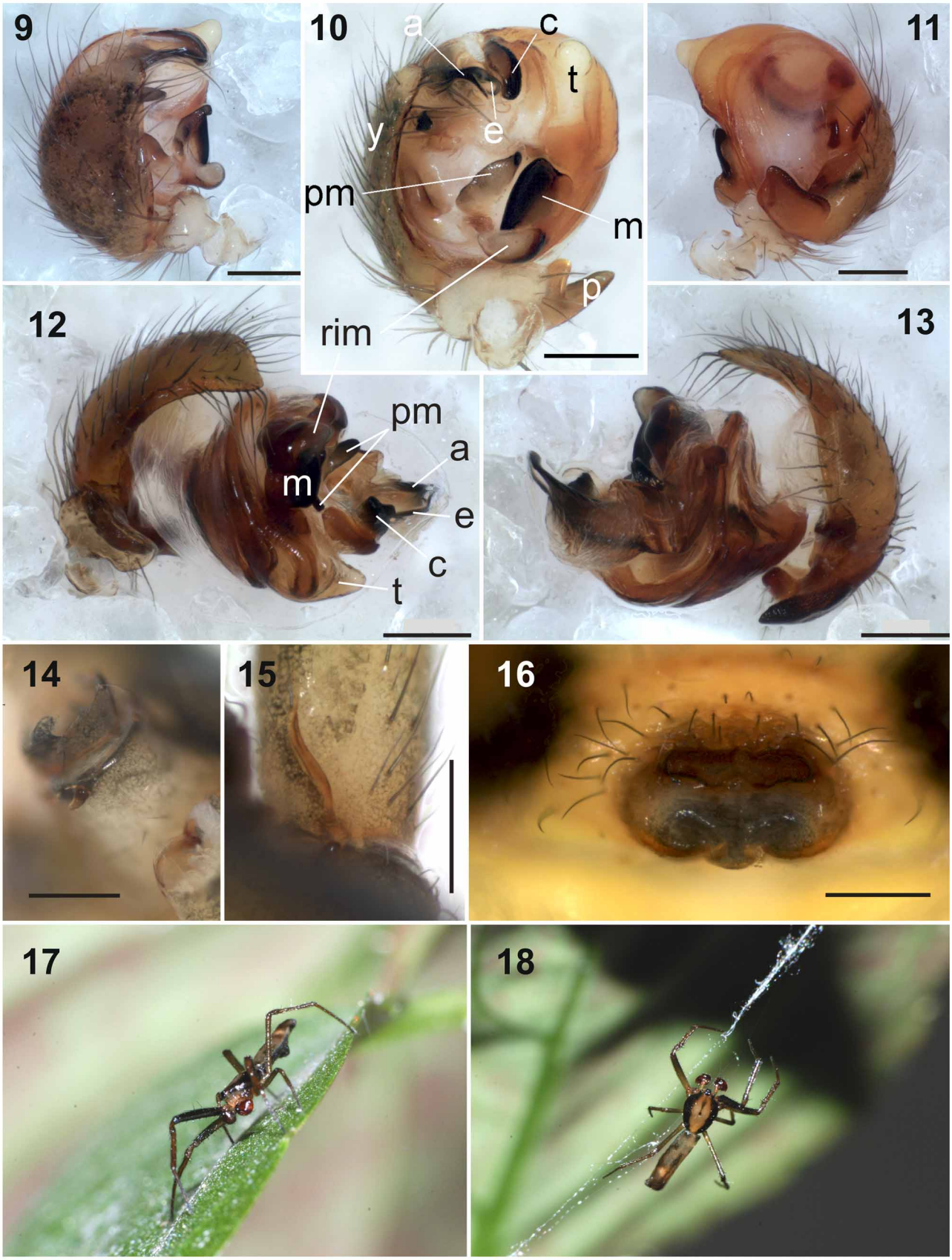
Geographic distribution (Fig. 19). *Micrathena shealsi* was only known from the type locality "Sunchal, Argentina" (Chickering 1960a). Although Levi (1985) assigned this locality to Salta Province, "Sunchal" in the latter does not fall within the rainforests region (Fig. 19); in contrast, "Sunchal" or "El Sunchal" in Tucumán Province, seems more likely for a rainforest-dwelling spider. New records here provided reveal that *M. shealsi* has an extensive distribution in the Yungas, corresponding to the higher altitudinal belt (~1700 m.) of the mountain forests and rainforests from Tucumán, Salta and Jujuy Provinces (Fig. 19).

Acknowledgements

We want to thank Luis E. Acosta (Universidad Nacional de Córdoba) and Maria Rita M. Poeta (Museu de Ciências e Tecnologia da PUCRS, MCTPs, Brazil) for helpful comments and excellent corrections on the manuscript; and to Facundo Labarque and Matías Izquierdo (MACN-Ar) for other constructive comments. This contribution is a part of the Ph.D. thesis of G.D.R. (Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba) supported by a research scholarship given by the Argentinean Consejo Nacional de Investigaciones Científicas y Técnicas—CONICET. Additional funding was given to Martín J. Ramírez (MACN-Ar) by FONCyT (PICT–2007–01393) and to L.E. Acosta by CONICET (PIP 2010-2012, Res. 918/10). Finally, we would like to thank Fernando Álvarez-Padilla, an anonymous reviewer and Gustavo Hormiga for their comments and suggestions on an earlier version of this paper.



FIGURES 1–8. *Micrathena shealsi* Chickering 1960. 1–7, male from Cochuna, Tucumán (MACN-Ar 27856); body view (1, dorsal; 2, front; 3, ventral; 4, lateral), and palpal morphology (5, prolateral; 6, ventral; 7, retrolateral). 8, female (cleared epigynum, ventral). Abbreviations: a = terminal apophysis; c = conductor; e = embolus; m = median apophysis; pm = paramedian apophysis; sr = seminal receptacles; t = tegulum. Scale bars: (1, 3–4) 1 mm; (2) 0.5 mm; (5–8) 0.2 mm.



FIGURES 9–18. *Micrathena shealsi* Chickering 1960. 9–11, left palp (9, prolateral; 10, ventral; 11, retrolateral); 12–13, expanded left palp (12, prolateral; 13, retrolateral); 14, coxal hook; 15, groove on the second femur; 16, epigynum (ventral); 17–18, habitus in nature (Cochuna, Tucumán, 2011). Abbreviations: a = terminal apophysis; c = conductor; e = embolus; m = median apophysis; p = paracymbium; pm = paramedian apophysis; t = tegulum; y = cymbium. Scale bars: (9–16) 0.2 mm.

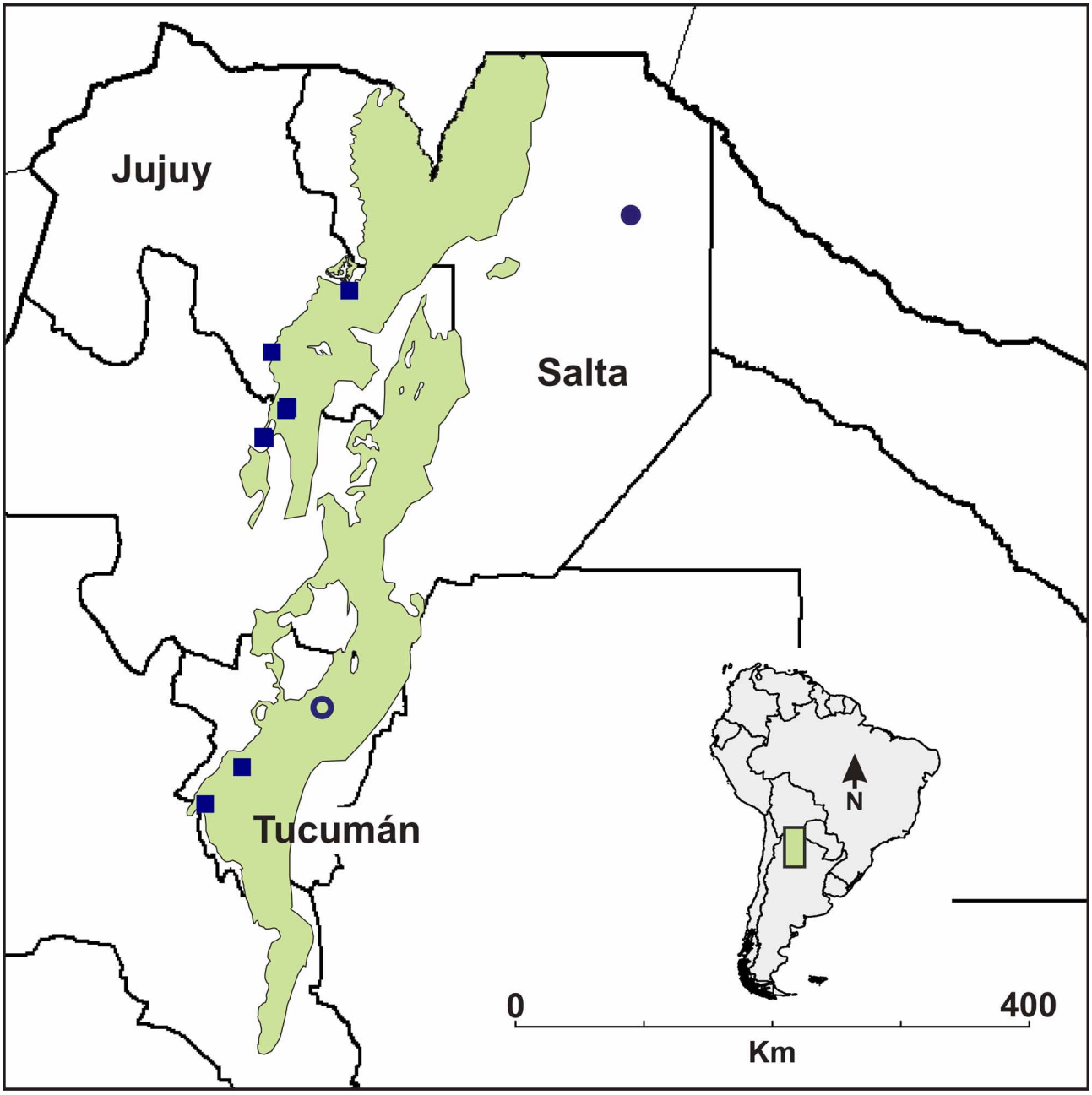


FIGURE 19. Locality records of *Micrathena shealsi* Chickering 1960 (blue squares), and extent of the Yungas ecoregion (green area) in northwestern Argentina (from Brown *et al*. 2006). The type locality is either Sunchal, Salta Province (solid circle) or El Sunchal, Tucumán Province (open circle). Inset: location of the map area in South America.

References

Bonaldo, A.B. (1990) Descrição do macho de *Micrathena kirbyi* (Perty, 1833) (Araneae, Araneidae). *Iheringia Série Zoologia*, 70, 89–91.

Brown, A.D., Martínez-Ortíz, U., Acerbi, M. & Corcuera, J. (2006) *La situación ambiental argentina 2005*. Fundación Vida Silvestre Argentina, Buenos Aires, 587pp.

Chickering, A.M. (1960a) Three new species of *Micrathena* (Araneae: Argiopidae) from South America. *Breviora*, 121, 1–11.

Chickering, A.M. (1960b) Six new species of *Micrathena* (Araneae, Argiopidae) from South America with notes on known species. *Proceedings of the Zoological Society of London*, 135, 65–89.

Chickering, A.M. (1961) The genus *Micrathena* (Araneae: Argiopidae) in Central América. *Bulletin of the Museum of Comparative Zoology*, 125 (13), 389–470.

Gonzaga, M.O. & Santos, A.J. (2004) A new species and a new synonymy in the spini orb-weaver spider genus *Micrathena*

(Araneae, Araneidae). *The Journal of Arachnology*, 32, 332–335.

Hijmans, R.J., Guarino, L., Jarvis, A., O`Brien, R., Mathur, P., Bussink, C., Cruz, M., Barrantes, I. & Rojas, E. (2005) *DIVA-GIS, version 5.4*. Available from: http://www.diva-gis.org/ (23 March 2011)

Levi, H.W. (1985) The Spiny Orb-Weaver Genera *Micrathena* and *Chaetacis* (Araneae: Araneidae). *Bulletin of the Museum of Comparative Zoology*, 150, 429–618.

Lise, A.A. (1995) Description of the male of *Micrathena peregrinatorum* (Holmberg, 1883) (Araneae, Araneidae). *Revista Brasilera de Entomología*, 39, 221–223.

Magalhães, I.L.F. & Santos, A.J. (2011) Two new species and taxonomic notes on the Neotropical spiny orb-weaving spiders *Micrathena* and *Chaetacis* (Araneae: Araneidae), with remarks on the development of *Micrathena excavata*. *Zootaxa*, 2983, 39–56.

Platnick, N.I. (2011) The world spider catalog, version 12. American Museum of Natural History. Available from: http://research.amnh.org/entomology/spiders/catalog/index.html (26 September 2011).

Rubio, G.D. & González, A. (2010) The first Symphytognatidae (Arachnida: Araneae) from Argentina, with the description of a new species of *Anapistula* from the Yungas mountain rainforest. *Revista Chilena de Historia Natural*, 83, 243–247.

Sabogal, A.G. & Flórez, E.D. (2000) Spiny spiders of the genus *Micrathena* Sundevall, 1833 (Araneae: Araneidae) from Colombia. *Biota Colombiana*, 1(3), 253–260.