



Description of the female of *Drymusa serrana* Goloboff & Ramírez, 1991 (Araneae: Drymusidae) with notes on its biology

FACUNDO M. LABARQUE¹ & MARTÍN J. RAMÍREZ²

División Aracnología, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Av. Ángel Gallardo 470, C1405DJR Buenos Aires, Argentina. E-mail: ¹facundo_labarque@macn.gov.ar; ²ramirez@macn.gov.ar

Abstract

The female of *Drymusa serrana* Goloboff & Ramírez, 1991, is described. The presence of the species in San Luis provinces, Argentina, is confirmed. We provide descriptions of the web and egg-sacs.

Key words: Araneae, Scytodoidea, Drymusidae, taxonomy, Argentina

Introduction

The family Drymusidae includes only the genus *Drymusa* Simon, 1891, which comprises fifteen described species (Platnick 2007). Three of them occur in South Africa and the remaining twelve in the Neotropical region. In the past few years, the descriptions of new species of *Drymusa* increased dramatically, especially for South America, with five new species from Brazil (Brescovit *et al.* 2004; Bonaldo *et al.* 2006) and one from Chile (Labarque & Ramirez 2007).

Drymusidae is currently considered close to Scytodidae and Periegopidae due to the presence of a field of spicules on the median surface of the posterior median spinnerets and by having asymmetrical superior claws in the anterior two pairs of legs, with a double row of teeth on the proclaw and a single row on the retroclaw (Labarque & Ramirez 2007). The tracheal system has a unique median apodemal lobe, characteristic of a restricted Scytodoidea: Scytodidae, Sicariidae, Drymusidae, and Periegopidae (Platnick *et al.* 1991; Forster 1995; Ramírez 2000).

In this contribution we present the description of the female of *Drymusa serrana*, provide notes on its habitat, web and egg-sacs, and confirm its known distribution.

Material and methods

All the specimens and the egg-sacs examined are deposited in the arachnological collection of the Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Buenos Aires (MACN-Ar, Cristina Scioscia). Female genitalia were observed in clove oil after dissection, with or without previous digestion with KOH. The drawings were made with camera lucida mounted on a stereoscopic compound microscope Olympus BH-2; pictures were made with a digital camera Nikon DXM1200 mounted on a stereoscopic microscope Nikon SMZ1500, the focal planes were composed with Helicon Focus 3.10.3. (Khmelik *et al.*, 2006); live pictures were made with a Canon EOS Rebel and a Nikon D100 digital cameras. Measurements are given in millimeters.

Taxonomy

Drymusa serrana Goloboff & Ramírez, 1991

(Figs. 1–23)

Type. Male holotype (MACN-Ar 8752) from Argentina, Buenos Aires Province, Sierra de la Ventana, Oct. 1980, P. Goloboff and A. Zanetic cols., examined.

Other examined material. Argentina: Buenos Aires Province: Sierra de la Ventana, Parque Provincial Ernesto Tornquist, Cueva del Toro (38° 1.142' S; 62° 0.97' W), 10 Jan 2005, G. Binford, J. Miller, F. Labarque and C. Ellison cols., 1♀ (MACN-Ar 11017), 2♀ (MACN-Ar 11018, 11020), 1 penultimate ♀ (MACN-Ar 11019), 2♂ (MACN-Ar 11021, 11022); same data as holotype, 4 immatures (MACN-Ar 8754); same locality, 26 May 1990, Anghilante col., 1 immature (MACN-Ar 11023); Oct–Nov 1964, Gallardo col., 1 immature (MACN-Ar 11024). San Luis Province: Merlo (32° 21.434' S; 64° 56.786' W), 31 Dec 2004, G. Binford, J. Miller, F. Labarque and C. Ellison cols., 2♀ (MACN-Ar 11012, 11015), 2 penultimate ♀ (MACN-Ar 11013, 11016), 3♂ (MACN-Ar 10790, 11011, 11014); Villa Elena, 10–11 Nov 1982, E. Maury col., 1 immature (MACN-Ar 8789).

Diagnosis. The female of *D. serrana* is distinguished from the other species by the presence of two sclerotized lips on the epigastric furrow (Figs. 4–6, 8) and spermathecae with tubular receptacula associated (Figs. 9–14).

Description of female (MACN-Ar 11017): Carapace orange slightly darker at margins, with two brownish dark spots forming a "V" and three lateral radial lines (Figs. 1, 7), darker zones with thicker setae. Eye area brownish. Abdomen gray with brownish chevron, cardiac area dark (Figs. 1–3, 7). Total length, 10.76. Cephalothorax 4.80 long, 3.72 wide, low and flattened, without fovea. Chelicerae with two teeth and a lamina in the promargin and two small teeth in the retromargin; fangs short, stout, curved. Endites elongated, converging in front of the labium, with fleshy apical edge. Labium 1.36 long, 1.02 wide, separated from sternum by a suture. Sternum 2.22 long, 1.90 wide, rounded posteriorly. Leg measurements: Femur: I: 12.06, II: 10.43, III: 7.82, IV: 10.43; Patella: I: 1.50, II: 1.44, III: 1.34, IV: 1.20; Tibia: I: 11.90, II: 10.11, III: 7.34, IV: 9.78; Metatarsus: I: 11.74, II: 9.78, III: 7.34, IV: 9.78; Tarsus: I: 2.14, II: 1.90, III: 1.64, IV: 2.12; Total: I: 39.34, II: 33.66, III: 25.47, IV: 33.31. Tibiae and metatarsi without recurved setae, only with filiform and spiniform setae. Tarsi long and thin, ventral face with abundant setae, with thick setae beneath third claw, and well developed onychium. The superior claws of the anterior two pairs of legs with a double row of teeth on the ventral surface of the proclaw and a single row on the retroclaw. Paired claws of tarsi I with 15 teeth and of tarsi IV with 19.

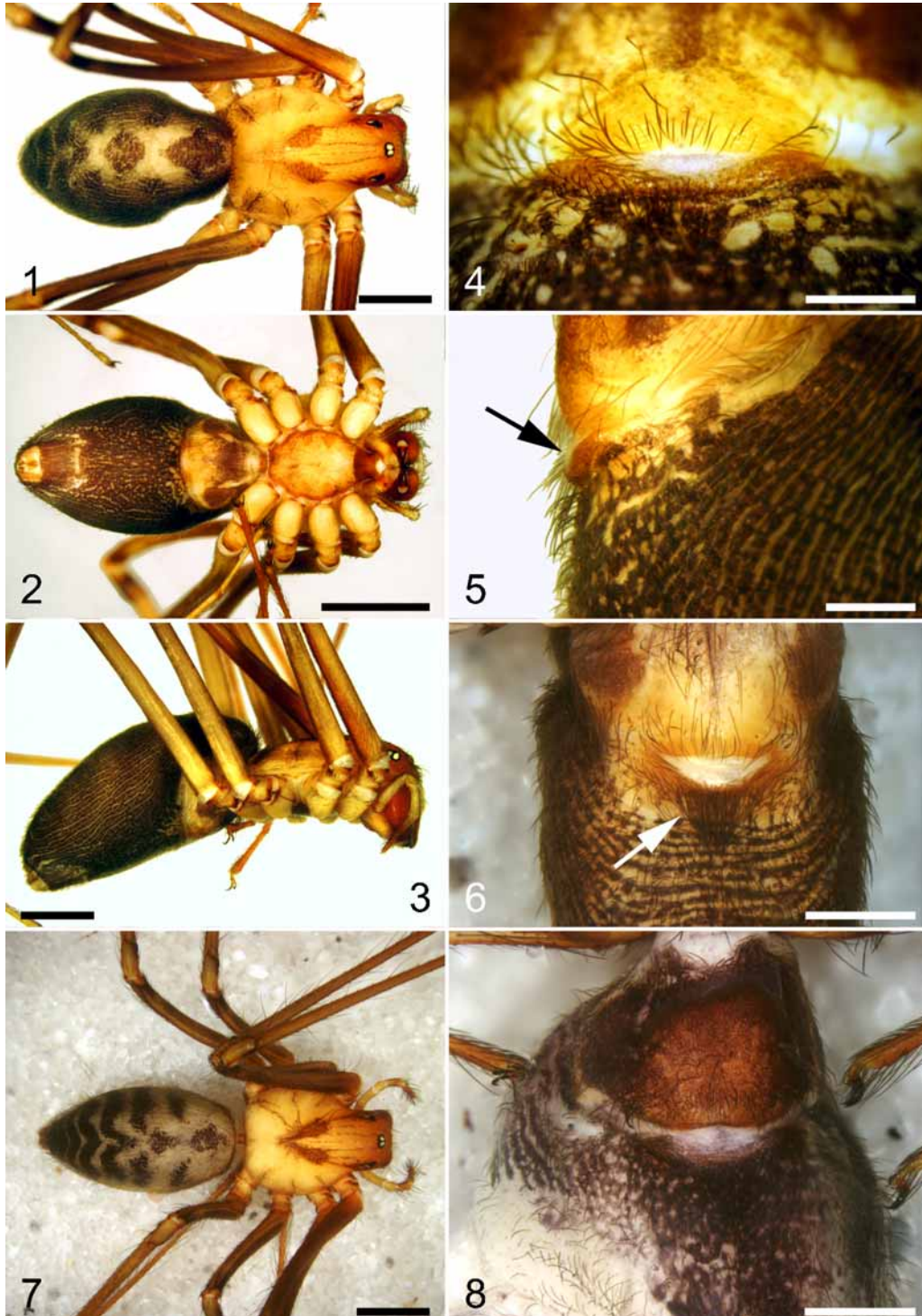
Abdomen elongated, posteriorly acute; without cuticular wrinkles. Colulus evident. Spinnerets arrangement: Anterior lateral spinnerets with two major ampullate gland spigots, posterior spigot smaller; posterior median spinnerets with a field of spicules on the median surface and posterior lateral spinnerets with several spigots.

Genital area with a raised lip posterior to the epigastric furrow, more sclerotized at the sides, bearing thick setae; without sclerotized plates (Fig 4–6, 8) around genital area. Vulva with a pair of small oval spermathecae, irregular or tetrahedral, with or without one to three tubular receptacles on each side (Figs. 9–11). The number and presences of tubular receptacles are variable in other females, often asymmetrical (Figs. 12–14).

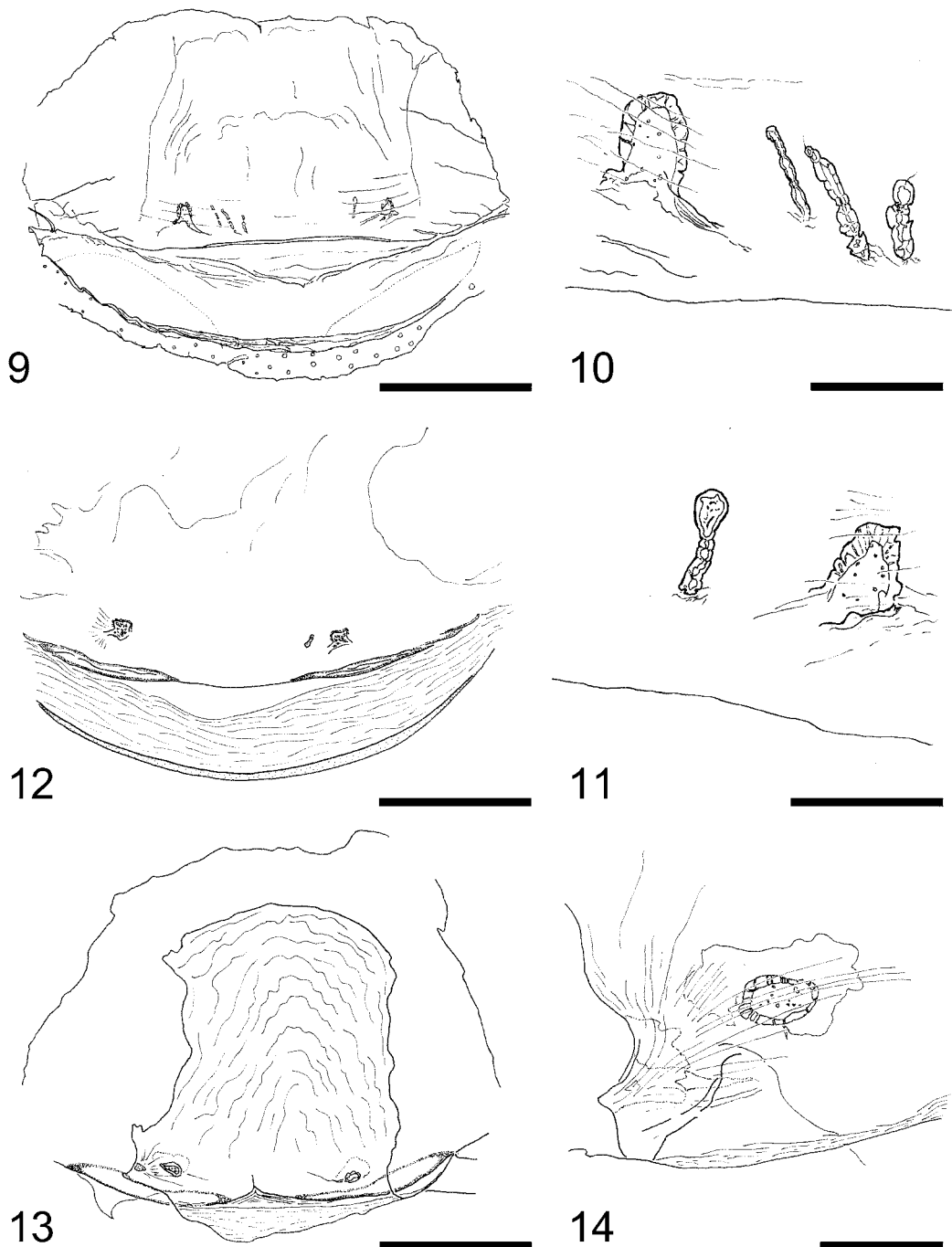
Variation. *Females* (n = 6). Total length 10.76–9.70. Cephalothorax, 4.80–4.12 long, 3.72–3.00 wide. Femur I: 12.06–9.05. The extremes are specimens MACN-Ar 11017 (larger) and MACN-Ar 11015 (smaller). Internal genital area differs between specimens. Spermathecae can be oval, tetrahedral, or more irregular and tubular receptacles could differ in shape and number, sometimes absent on one or both sides (Figs. 9–14). *Males* (n = 6). Total length 9.13–6.30. Cephalothorax, 3.72–2.68 long, 3.16–2.12 wide. Femur I: 13.69–8.08. Measurements from specimens MACN-Ar 11022 (larger) and MACN-Ar 11014 (smaller).

Description of egg-sacs. Here we described the egg-sacs of *D. serrana* for the first time. We found four egg-sacs in total, each of them associated with a female, in a superficial cavity (Cueva del Toro). One of them

was not accessible for collection (but was photographed, see Fig. 19). One egg-sac contained 41 eggs, the other two 78 and 51 spiderlings. The egg-sacs are spherical to oval in shape, larger than the female body. The internal silk lining is white, finely meshed, and the external surface is covered with debris, like prey remains, pieces of exuviae, pieces of leaves, and other detritus. The sacs were found hanging on the webs, attached by several threads (Figs. 16–19).

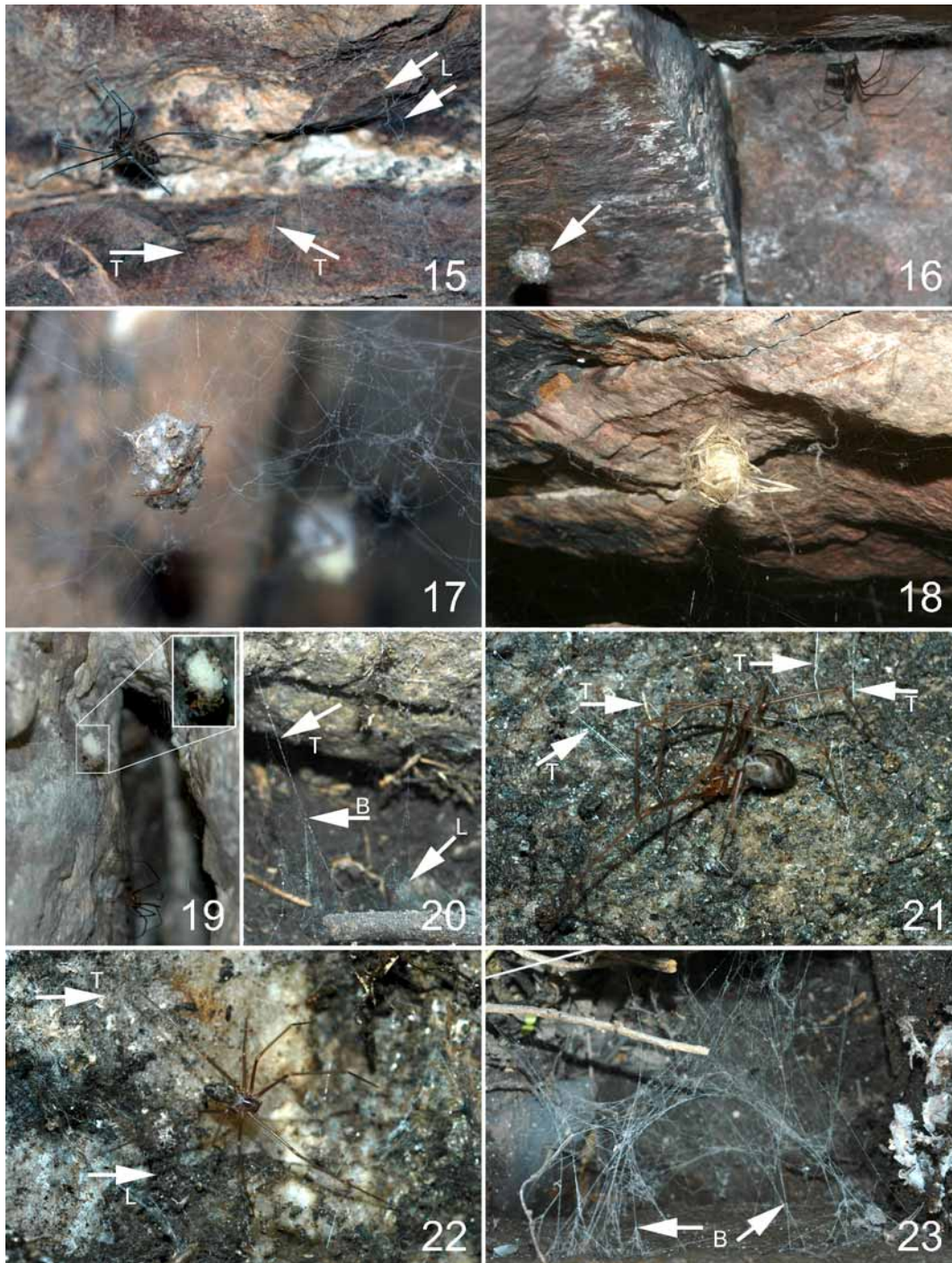


FIGURES 1–8. *Drymus serrana* Goloboff & Ramírez, 1991, preserved females. 1–6, Sierra de la Ventana (1–5, MACN-Ar 11017, 6, MACN-Ar 11018); 1, habitus dorsal; 2, ventral; 3, lateral; 4, detail of the epigastric area, ventral (left side of sclerotized lip shaved); 5, same, lateral (arrow points to sclerotized lip); 6, epigastric area, ventral (arrow points to thick setae). 7–8, Merlo; 7, habitus dorsal (MACN-Ar 11015); 8, epigastric area, ventral (MACN-Ar 11012). Scale bars: 1-3, 7: 2 mm; 6, 8: 1 mm; 4-5: 0.5 mm.



FIGURES 9–14. *Drymusia serrana* Goloboff & Ramírez, 1991, female genitalia. 9–12, Sierra de la Ventana (9–11, MACN-Ar 11017; 12, MACN-Ar 11018); 9, vulva, dorsal view; 10, detail of spermathecae and tubular receptacula, left side; 11, same, right side; 12, vulva, dorsal view. 13–14. Merlo (MACN-Ar 11015); 13, vulva, dorsal view; 14, detail of left spermatheca, tubular receptacula absent. Scale bars: 9, 12–13: 0.5 mm; 10–11, 14: 0.1 mm.

Description of web. The webs of *D. serrana* were found attached to large supporting objects such as the crevices in the cave's walls (Figs. 15, 19) or under rocks (Figs. 21–22). The spiders rested on the underside of the web (Figs. 15, 16) and also layed their eggs there (Figs. 16–19). The lines in the sheet were not arranged in geometrically regular arrays; there were straight lines under tension (arrows T, Figs. 15, 20–22), connected by loose lines that sagged when dusted with cornstarch (arrows L, Figs. 15, 20, 22). The tense lines have multiple anchor points attaching to the surface (arrows B, Figs. 20, 23). We also found a web with a deviating sort of pattern (Fig. 23) under rocks, parallel to the surface.



FIGURES 15–23. *Drymusa serrana* Goloboff & Ramírez, 1991, living specimens, egg-sacs and web. 15–19, Sierra de la Ventana. 15, female hanging in its web inside the cave (dusted with cornstarch); 16, same (top right) and spherical egg-sac covered with detritus (white arrow); 17, oval egg-sacs covered with prey and moult remains (note the thread lines around them); 18, spherical egg-sac covered with fallen leaves; 19, female (down right) with an egg-sac in the crevices of the cave (detail to the eggs inside the sac). 20–23, Merlo. 20, detail of a pair of straight lines touching a surface; 21, immature male hanging on its web under a rock; 22, same, adult male; 23, web with a deviating sort of pattern. Arrows: T, straight lines; L, loose lines; B, bifurcations. Photos 15–17, 19–23 by Jeremy Miller; 18 by Greta Bindford.

Natural history. The male holotype was found near the Cerro de La Ventana (Buenos Aires Province, Argentina), under big rocks in stream creeks (Goloboff & Ramírez, 1991). The new specimens collected in Sierra de La Ventana were found inside a shallow cavity, Cueva del Toro, at 565 meters of elevation, near the

type locality. The cave has an entrance of six meters in diameter that drops 10 meters before choking off. The spiders were hanging in their webs, more or less at a distance of one meter from the ground, between the crevices of the wall (Figs. 15–16, 19). All the samples were found in the inner half of the cave, which was wetter and darker than the outer half. These spiders were larger than the male holotype and also than the specimens from Merlo, San Luis Province. The specimens from Merlo were collected under a pile of rocks mixed with soil, covering tree roots inside an old construction without roof made with those rocks. The spiders were hanging in their webs at the inner side of the rocks (Figs. 21–22), where they moved quickly and gracefully.

Discussion

D. serrana as well as its congeners, shares with Scytodidae and Periegopidae the presence of a double row of teeth on the ventral surface of the retroclaw of tarsi I and II, and a field of spicules on the median surface of the posterior median spinnerets (Platnick *et al.* 1991; Labarque & Ramírez 2007). The female of *D. serrana* has many spigots on the PLS, as does the female of *Drymusa sp.* from South Africa that Platnick *et al.* (1991) illustrated. This is against Forster's (1955) suggestion to relate these families by the reduction of spigots, at least, on the posterior lateral spinnerets. This characteristic is heterogeneous within *Drymusa*, because at least the new *Drymusa* species described by Labarque & Ramirez (2007) has only one spigot on the PLS. The thick setae beneath the tarsal claws were wrongly interpreted as accessory claws in Goloboff & Ramírez (1991).

Within the Scytodoidea, there are different types of egg sacs. Female of the genus *Loxosceles* (Sicariidae) construct a silken basal plate on the substrate, lay a gelatinous mass with eggs on it, dry this mass by moving its palps and chelicerae and, finally, construct a cover plate (Japyassú *et al.* 2003). For Drymusidae, females of *Drymusa dinora* Valerio, 1971, and *Drymusa spectata* Alayón García, 1981, build a white, spherical, wrinkled egg-sac, which occasionally hangs in the web, close to them. They also carry and transport the egg-sac like *Scytodes* Blackwall, 1864 (Scytodidae) (Valerio 1974; Alayón García 1981). However, they sometimes leave the egg-sacs to attack a prey or because of a web perturbation (Valerio 1974). While *D. dinora* and *D. spectata* build a white spherical egg-sac, *D. serrana* covers its external surface with different types of detritus. Unfortunately, we were not able to document *D. serrana* carrying and transporting the egg-sac with the chelicerae. However all the egg-sacs that we collected were attached to the webs.

Acknowledgements

We wish to thanks to Greta Binford, Jeremy Miller and Christian Ellison for they help and orientation in the field, for they advices, knowledge and histories, for the collecting trip and the pictures; also we wish to thanks specially to Greta Binford for comments to an early version of this manuscript and to her students, Turin Hill and Elise Maxwell, for providing information about the egg-sacs. We wish to thanks to Cristian Grismado for help with laboratory techniques, bibliography and for comments to an early version of this manuscript. We also wish to thanks the Departamento Áreas Protegidas, Dirección Administración de Áreas Protegidas y Conservación de la Biodiversidad of Buenos Aires Province for the authorization to work in the Parque Provincial Ernesto Tornquist (Ventania); Guardaparque Facundo Casalle Pintos for assistance in the field work; Gobierno de la Provincia de San Luis, Ministerio de Acción Social, Programa de Planificación y Gestión Ambiental (Argentina) for the authorization to work in the San Luis Province. This project was supported by grants PICT 14092 from the Agencia Nacional de Promoción Científica y Tecnológica, Argentina, and U.S. National Science Foundation (EAR-0228699).

References

- Alayón García, G. (1981) El género *Drymusa* (Araneae: Loxoscelidae) en Cuba. *Poeyana*, 219, 1–19.
- Brescovit A.D., Bonaldo A.B. & Rheims C.A. (2004) A new species of *Drymusa* Simon, 1891 (Araneae, Drymusidae) from Brazil. *Zootaxa*, 697, 1–5.
- Bonaldo, A.B., Rheims, C.A. & Brescovit A.D. (2006) Four new species of *Drymusa* Simon (Araneae, Drymusidae) from Brazilian Oriental Amazonia. *Revista Brasileira de Zoologia*, Curitiba, 23 (2), 455–359.
- Forster, R.R. (1995) The Australian spider family Periegopidae Simon, 1893 (Araneae: Sicarioidea). *Records of the Western Australian Museum Supplement*, 52, 91–105.
- Goloboff, P.A. & Ramírez, M.J. (1991) A new species of *Drymusa* (Araneae: Scytodidae) from Argentina. *Journal of the New York Entomological Society*, 99, 691–695.
- Japyassú, H.F., Macagnan, C.A. & Knysak, I. (2003) Eggsac recognition in *Loxosceles gaucho* (Araneae, Sicariidae) and the evolution of maternal care in spiders. *The Journal of Arachnology*, 31, 90–104.
- Khmelik, V.V., Kozub, D. & Glazunov A. (2006) Helicon Focus 3.10.3 <http://www.heliconsoft.com/heliconfocus.html> (Accessed 23 May 2007)
- Labarque, F.M. & Ramírez, M.J. in press (2007) A new species of *Drymusa* Simon, 1819 (Araneae: Drymusidae) from Chile. *Studies on Neotropical Fauna and Environment*, DOI: 10.1080/01650520601179656
- Platnick, N.I., Coddington J.A, Forster R.R. & Griswold C.E. (1991) Spinneret morphology and the phylogeny of haplogyne spiders (Araneae, Araneomorphae). *American Museum Novitates*, 3016, 1–73.
- Platnick, N.I. (2007) The world spider catalog, version 7.5. American Museum of Natural History. Available from <http://research.amnh.org/entomology/spiders/catalog/INTRO1.html> (Accessed 12 May 2007)
- Ramírez, M.J. (2000) Respiratory system morphology and the phylogeny of haplogyne spiders (Araneae, Araneomorphae). *The Journal of Arachnology*, 28, 149–157.
- Valerio, C.E. (1974) Prey capture by *Drymusa dinora* (Aranea, Scytodidae). *Psyche*, 81, 248–287.