ZOOLOGIA 31 (3): 275–280, June, 2014
http://dx.doi.org/10.1590/S1984-46702014000300010

Redescription of *Dubiaranea argenteovittata* (Araneae: Linyphiidae), type species of the genus, and description of the male

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ABSTRACT. *Dubiaranea argenteovittata* Mello-Leitão, 1943 was described from the state of Rio Grande do Sul, Brazil, based on a female. We describe and illustrate the male of the species for the first time, and provide the first records for the states of Santa Catarina and Paraná. The redescription and illustrations of the female is based on the holotype and new material from the type locality. New distributional records are also provided for the state of Rio Grande do Sul.

KEY WORDS. Araneoidea; Brazil; Dubiaraneinae; Neotropical Region; spider taxonomy.

Among the genera of spiders of Linyphiidae described for South America, *Dubiaranea* Mello-Leitão, 1943 includes the largest number of species. Currently about 100 species have been described for the Neotropical Region and only one, *Dubiaranea deelemanae* Millidge, 1995, was described from Borneo (Platnick 2014).

The latest revision of *Dubiaranea* was carried out by Millidge (1991), who described 80 new species, representing 80% of the species known today. However, only 27 species are known from both males and females, and 48 are based only on females (Rubio *et al*. 2010). Additionally, some of the species' descriptions are based on a single specimen, which means that their intraspecific variability is completely unknown (Rubio *et al*. 2010). This is the case of *D. argenteovittata*, which was described by Mello-Leitão (1943).

Dubiaranea argenteovittata Mello-Leitão, 1943 is the type species of the genus and was described from the state of Rio Grande do Sul, Brazil, based on a female. Levi (1967) transferred the genus to its current familial placement and illustrated the female body and genitalia. According to Levi (1967) the large colulus, the structure of the carapace, the remaining leg spines, and the structure of the chelicerae indicate that the species belongs to Linyphiidae. The genus is characterized by median posterior eyes placed on tubercles, being larger than the other eyes, all eyes with black margins in both sexes; suprategular apophysis and embolic division shaped as a mesal plate, paracymbium long, filiform, shaped as a hook, elongated embolus with embolic membrane well developed in males. Females can be recognized by the U-shaped spermathecae, spiral ducts, usually with a small scape in epigynum, well developed in many species, with lateral depressions forming an atrium.

Through examination of material belonging to various spider collections, the male of *D. argenteovittata* was found. In this paper we redescribe and illustrate the female based on the holotype and additional material from the type locality, describe and illustrate the male, add the first records for the states of Santa Catarina and Paraná, Brazil, as well as additional records for the state of Rio Grande do Sul.

MATERIAL AND METHODS

Specimens are deposited in the arachnological collection of Museu de Ciência e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (MCTP, Arno A. Lise), Museo de Ciências Naturais da Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre (MCN, Ricardo Ott), Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro (MNRJ, Adriano B. Kury), and Instituto Butantan, São Paulo (IBSP, Roberto H.P. Moraes). Study of the reproductive structures of males and females was performed after immersing the epigynum and the embolic division in methyl salicylate and/or clove oil for approximately 30 minutes, until the internal structures could be clearly observed. In order to expand the bulb, palps were immersed in 10% potassium hydroxide for approximately two hours, and subsequently transferred to distilled water (Levi 1965). Specimens are preserved in 70% ethanol. For illustrations, structures were examined under a Leica® MZ9.5 stereomicroscope fitted with a camera lucida. Trichobothrium position on metatarsus I follows Denis (1949), tibial spine formula follows Roberts (1987), and terminology follows Millidge (1980, 1993) and Miller (2007). All measurements are given

in millimeters and were performed using a scale reticle in the eyepiece of the stereomicroscope.

Variation in measurements is presented for total length, length and width of cephalothorax, and femur length in both males and females. The following abbreviations are used in the text: (AME) anterior median eyes, (ALE) anterior lateral eyes, (PLE) posterior lateral eyes and (PME) posterior median eyes; (TmI) trichobothrium position on metatarsus I.

TAXONOMY

Dubiaranea argenteovittata Mello-Leitão, 1943

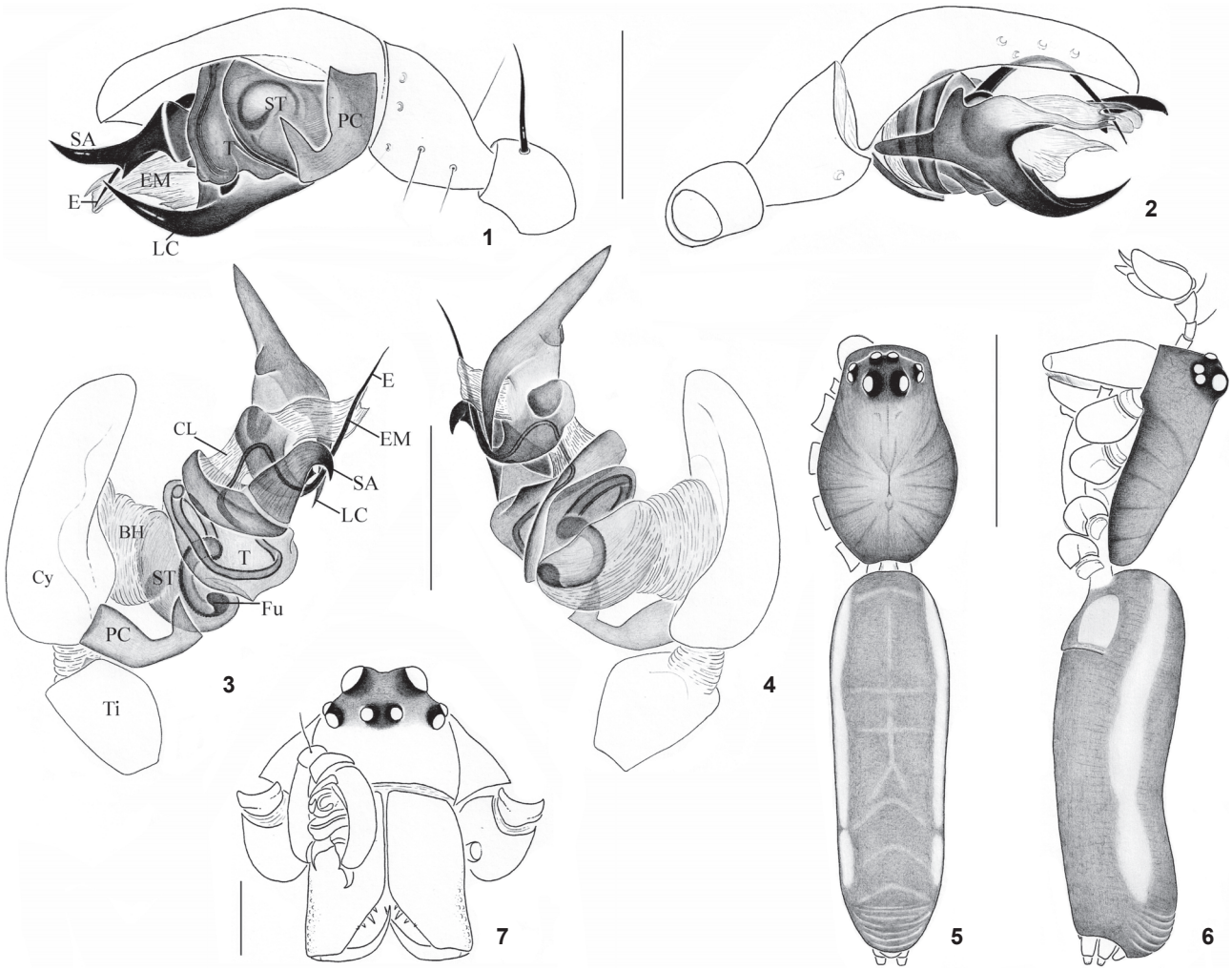
Figs 1-17

Dubiaranea argenteovittata Mello-Leitão, 1943: 166, 167, fig. 10, 10a (holotype female from Rio Grande do Sul, Brazil, B. Rambo *leg.*, deposited in MNRJ 41764, examined); Levi, 1967: 37, figs 45-48 (transfered from Theridiidae); Platnick, 2014.

Diagnosis. The male of *D. argenteovittata* resembles *D. levii* Millidge, 1991 (Millidge 1991: 49, figs 157, 158) by the large and distally pointed lamella characteristica (Figs 1, 2), tegulum with sinuous margin, slightly sinuous duct, forming a non-sinuous curve, and shape of paracymbium (Fig. 1), but differs by the following characteristics: distal suprategular apophysis longer, hooked distally and with tiny thorn ventrally (Fig. 1). The female of *D. argenteovittata* is closest to *D. levii* (Millidge 1991: 49, figs 159, 160) by the epigynum with a wide atrium (Fig. 8), spermathecae U-shaped and short fertilization ducts oriented posteriorly (Fig. 10), but differs by the less wide atrium (Fig. 8), median longitudinal plate in atrium narrow and by the longer copulatory ducts, forming a loop (Fig. 10).

Description. Male (MCN 31129, São Francisco de Paula, RS, Brazil): Total length 3.90. Carapace length 1.30, width 0.88. Clypeus height 0.26. Sternum length 0.78, width 0.57. Chelicerae length 0.67. Abdomen length 2.54, width 0.78, height 0.73. Leg formula I/II/IV/III; lengths (I/II/III/IV): femora 2.49/2.18/1.30/2.08; patellae 0.46/0.41/0.41/0.36; tibiae 2.18/1.76/0.98/1.56; metatarsi 2.70/2.23/1.30/2.13; tarsi 1.35/1.09/0.67/0.93; total 9.18/7.67/4.66/7.06. Palp (femur, patella, tibia, cymbium): 0.52/0.12/0.20/0.41. Separation coxae IV 0.20. Metatarsal trichobothria I-III present, IV absent. Tibial spine formula: 2-2-2-2. TmI 0.15. Eye diameters and interdistances: AME 0.05, ALE 0.06, PME 0.10 and PLE 0.06; AME-ALE 0.12, PME-PLE 0.08, AME-AME 0.06, PME-PME 0.21. Eyes with black margins, primarily AME, setae present at ocular area. Eyes on shallow black tubercles, mainly PME. Clypeus glabrous. Carapace (Figs 5, 6, 13, 14) red-brown, narrowed anteriorly, larger than wide, borders dark red-brown. Chelicerae (Fig. 7) brown, granulated in anterolateral area and with small hairs; chelicerae paturon with 10-12 small hairs. Chelicerae promargin with four teeth, retromargin with five tiny teeth, with setae between teeth. Dorsal spur in chelicerae absent. Endites brown, except yellow serrula area, with setae. Labium dark brown. Sternum brown, covered with dark brown dots, with long setae. Stridulatory ridge striated. Legs long and slender, yellow; coxae pale yellow. Abdomen (Figs 5, 6, 13, 14) longer than wide, with a slight median constriction, posteriorly striated, pale beige, dorsally with two longitudinal depigmented bands; ventrally and laterally beige. Spinnerets yellow-brown, covered with dark-brown dots. Colulus well developed. Paracymbium (Figs 1, 3) with straight hook, large base, distally with acute apex (Fig. 1) and poorly sclerotized. Paracymbium basal setae absent. Embolus long, narrowed at apex next to embolic membrane (Figs 3, 4). Embolic membrane well developed (Figs 1, 3). Protegulum present. Subtegulum large. Tegulum with sinuous margin and slightly sinuous duct, forming a non-sinuous curve (Figs 1, 3). Suprategulum sclerotized. Radix present. Tailpiece of radix absent. Suprategular apophysis long and sclerotized, hooked distally and with a tiny thorn ventrally (Figs 1-4). Lamella characteristica large, distally pointed (Figs 1, 2). Tibial apophysis absent. Palpal tibia with two retrolateral and one dorsal trichobothria. Palpal patellae with a dorsal macrosetae. Column present, membranous (Fig. 3). Fickert's gland absent.

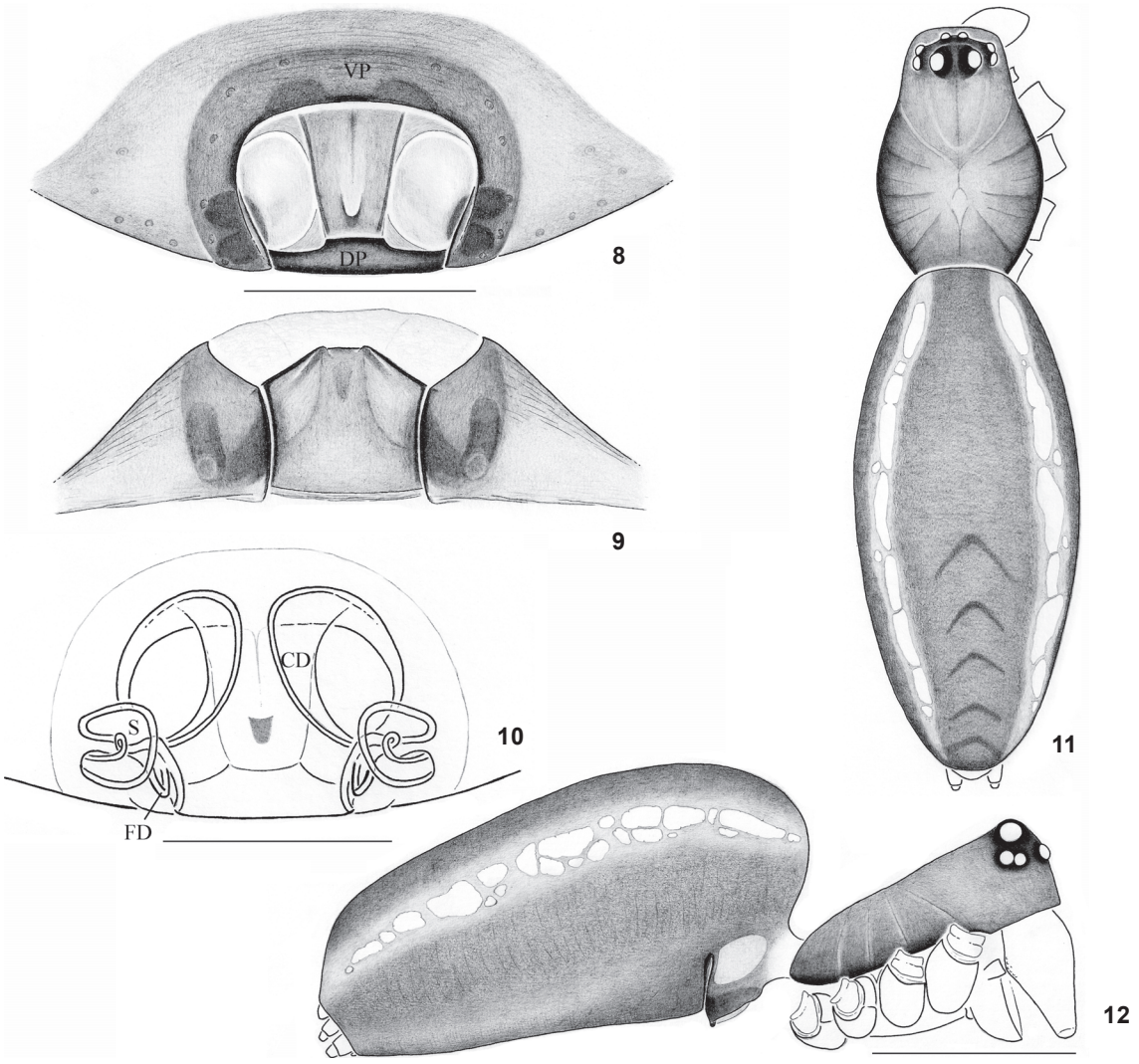
Female (MCN 31129, São Francisco de Paula, RS, Brazil): Total length 4.83. Carapace length 1.71, width 1.14. Clypeus height 0.26. Sternum length 0.88, width 0.72. Chelicerae length 0.72. Abdomen length 3.38, width 1.87, height 1.97. Leg formula I/II/IV/III; lengths (I/II/III/IV): femora 2.28/2.08/1.45/2.18; patellae 0.46/0.46/0.36/0.41; tibiae 2.13/1.76/0.71/1.61; metatarsi 2.39/2.02/0.85/2.08; tarsi 1.19/0.93/0.41/0.33; total 8.45/7.25/3.78/7.11. Palp (femur, patella, tibia, tarsus): 0.52/0.15/0.41/0.46. Separation coxae IV 0.15. Metatarsal trichobothria I-III present, IV absent. Tibial spine formula: 2-2-2-2. TmI 0.15. Eye diameters and interdistances: AME 0.04, ALE 0.06, PME 0.10 and PLE 0.06; AME-ALE 0.10, PME-PLE 0.06, AME-AME 0.06, PME-PME 0.16. Eyes (Figs 11, 12) with black margins, mainly PME, setae present at ocular area and behind eyes. Eyes on shallow black tubercles. Clypeus glabrous. Carapace (Figs 11, 12, 15, 16) red-brown, narrowed anteriorly, larger than wide, borders dark brown. Chelicerae as in male. Chelicerae promargin with four teeth, retromargin with five to six tiny teeth. Endites brownish, except yellowish serrula area, with setae. Labium dark brown. Sternum dark brown with long setae. Stridulatory apparatus as in male. Legs long and slender, yellowish-brown; coxae yellow. Abdomen (Figs 11, 12, 15, 16) longer than wide (Figs 11, 16), suboval, pale beige, dorsum with two longitudinal bands formed by white pearl-like pigment and 4-5 pale blackish chevrons in posterior half; ventrally and laterally (Fig. 12) beige. Spinnerets yellow-brown, covered with dark dots. Colulus well developed. Palpal tarsus with claw. Female epigynum with a subcircular wide atrium, with longitudinal median plate (Fig. 8). Ventral plate large, wider than long (Fig. 8). Dorsal plate large (Fig. 9). Spermathecae U-shaped (Fig. 10). Fertilization ducts in posterior portion of epyginum, arising from posterior region of spermathecae. Copulatory ducts long, forming a loop, with median trajectory close to each other (Fig. 10).



Figures 1-7. *Dubiaranea argenteovittata*. (1-4) Male palpus: (1) ectal view; (2) mesal view; (3) expanded, ectal view; (4) expanded, mesal view. (5-7) Male: (5) habitus; dorsal view; (6) lateral view; (7) cephalothorax, frontal view. (BH) Basal hematodocha, (CL) column, (Cy) cymbium, (E) embolus, (EM) embolic membrane, (Fu) fundus, (LC) lamella characteristica, (PC) paracymbium, (SA) suprategular apophysis, (ST) subtegulum, (T) tegulum, (Ti) tibia. Scale bars: 1-4: 0.25 mm, 5-7: 1.25 mm.

Variation. Total length (6 males) 3.01-4.16; carapace length 1.24-1.66, carapace width 0.78-1.09; femur I 2.18-2.60. Total length (6 females) 4.73-6.03; carapace length 1.56-1.76, carapace width 1.09-1.19; femur I 2.28-2.65. The color pattern is quite variable. Carapace yellow-brown to yellow and abdomen olive-green to dark olive-green to yellow, silvery spots sometimes absent in males and scattered in females.

Material examined. New records. Brazil. *Paraná*: Guarapuava, 25.VIII.1986, Equipe Profaupar *leg.*, 2 males, 1 female, Malaise trap (MCN 20515). *Santa Catarina*: Rancho Queimado, 08-12.X.1994, L. A. Moura *leg.*, 1 female (MCN 26253). *Rio Grande do Sul*: Derrubadas (Parque Estadual do Turvo), 19-22.X.2004, R. Ott *et al. leg.*, 2 females (MCN 38747); 27-31.X.2003, 1 female (MCN 38537); 27-31.X.2003, 1 male, 1 female, beating tray (MCN 37760); 27-31.X.2003, 1 female (MCN 37793); 25-30.IV.2005, 1 female, beating tray (MCN 39216); 19-22.X.2004, 1 female, beating tray (MCN 38832); R. Ott *et al. leg.*; Tenente Portela (Porto Garcia), 11.IX.1976, S. Scherer *leg.*, 1 female (MCN 4630); Marcelino Ramos, II. 1989, A. Braul *leg.*, 1 male (MCTP 19799); Santa Maria (Barragem Saturnino de Brito, margem do Ibicuí-Mirim), 06.VII.1982, M. Rosenau *leg.*, 1 male (MCN 10559); 06.VII.1982, M. Rosenau *leg.*, 1 male (MCN 10559); Encantado, 21.IX.1985, A.D. Brescovit *leg.*, 2 females (MCN 14531); Caxias do Sul (Vila Oliva), 15.I.1974, F. R. Meyer *leg.*, 2 females (MCN 2018); São Francisco de Paula (Barragem dos Bugres; Projeto Novas Áreas), 04.XI.1998, A. B. Bonaldo *leg.*, 1 male, 4 females



Figures 8-12. *Dubiaranea argenteovittata*. (8-10) Female epigynum: (8) ventral view; (9) posterior view; (10) clarified, dorsal view. (11, 12) Habitus: (11) dorsal view; (12) lateral view. (CD) Copulatory duct, (DP) dorsal plate, (FD) fertilization duct, (S) spermathecae, (VP) ventral plate). Scale bars: 8-10: 0.25 mm, 11, 12: 1.25 mm.

(MCN 31129); 01-04.II.1999, A.B. Bonaldo *leg*., 2 females (MCN 30537); 25.XI.1998, A.L.H. Silva, 1 male, 1 female (MCN 30959); (Potreito Velho), 11-14.IX.1997, A.A. Lise *leg*. (MCTP 13858); Nonoai (Parque Estadual de Nonoai), 14.I.1985, A.A. Lise *leg*., 1 female, 450 m de altitude (MCN 12831); 13.I.1985, A.A. Lise *leg*., 1 female (MCN 13050).

Distribution. Southern Brazil (states of Paraná, Santa Catarina and Rio Grande do Sul, Fig. 17).

Remarks. The female holotype is in poor condition. All distal leg articles after the femur are missing. The color pattern was completely lost in alcohol.

Natural history. Males and females were collected together in southern Brazil. The species may be collected from arboreal strata (by beating the higher vegetation strata or manually), grasses and bushes (with a sweeping net). They build large webs on the vegetation, approximately 40-50 cm from the ground (E.N.L. Rodrigues, pers. obs.). In the state of Rio Grande do Sul, the species was registered at altitudes up to 450 m above sea level.

ACKNOWLEDGEMENTS

We thank the curators of the arachnological collections for the loan of specimens. To the director's office of Museu de Ciências Naturais (MCN, FZB-RS) for allowing the senior au-

Figures 13-16. *Dubiaranea argenteovittata*: (13-14) Male habitus: (13) lateral view; (14) dorsal view. (15-16) Female habitus: (15) lateral view; (16) dorsal view.

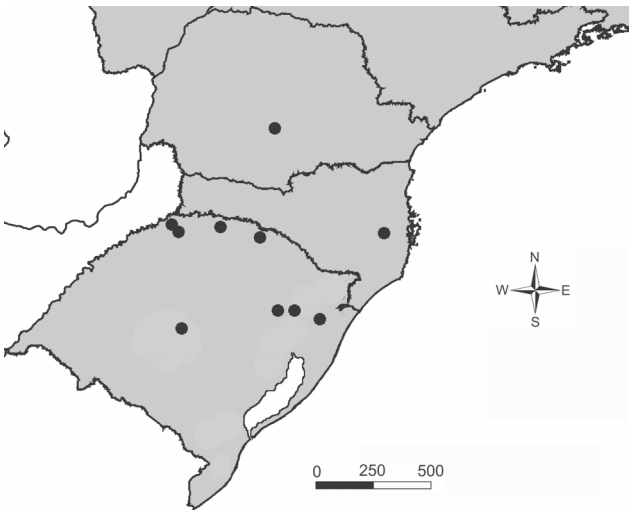


Figure 17. Map of southern Brazil showing the distribution of *Dubiaranea argenteovittata*.

thor to carry out part of this work in its facilities. Everton N.L. Rodrigues was supported by FAPESP (process 2011/02036-7) and Antonio D. Brescovit is supported by CNPq (process 301776/2004-0). We also thank two anonymous reviewers and the editor for their valuable comments.

LITERATURED CITED

Denis, J. 1949. Notes sur les érigonides. XVI. Essai sur la détermination des femelles d'érigonides. **Bulletin de la Société d'Histoire Naturelle de Toulouse 83**: 129-158.

Levi, H.W. 1965. Techniques for the study of spider genitalia. **Psyche 72**: 152-158.

Levi, H.W. 1967. Habitat observations, records, and new South American theridiid spiders (Araneae, Theridiidae). **Bulletin of the Museum of Comparative Zoology 136** (2): 21-37.

Mello-Leitão, C.F. 1943. Catálogo das aranhas do Rio Grande do Sul. **Arquivos do Museu Nacional 37**: 149-245.

Miller, J.A. 2007. Review of erigonine spider genera in the Neotropics (Araneae: Linyphiidae, Erigoninae). **Zoological Journal of the Linnean Society 149** (Suppl. 1): 1-263.

Millidge, A.F. 1980. The erigonine spiders of North America. Part 1. Introduction and taxonomic background (Araneae: Linyphiidae). **Journal of Arachnology 8**: 97-107.

Millidge, A.F. 1991. Further linyphiid spiders (Araneae) from South America. **Bulletin of the American Museum of Natural History 205**: 1-199.

Millidge, A.F. 1993. Further remarks on the taxonomy and relationships of the Linyphiidae, based on the epigynal duct conformations and other characters (Araneae). **Bulletin of the British Arachnological Society 9**: 145-156.

Platnick, N.I. 2014. **The world spider catalog, version 14.5.** New York, American Museum of Natural History. Available on line at: http://research.amnh.org/entomology/spiders/catalog/index.html [Accessed: 01/IV/2014].

Roberts, M.J. 1987. **The spiders of Great Britan and Ireland: Linyphiidae and check list.** Colchester, Harley Books, vol. 2.

Rubio, G.D.; E.N.L. Rodrigues & L.E. Acosta. 2010. Description of the male of the spider *Dubiaranea difficilis* (Araneae: Linyphiidae), with new records and modeling of its potential geographic distribution. **Zootaxa 2405**: 55-62.

Submitted: 03.II.2014; Accepted: 28.IV.2014.
Editorial responsibility: Gabriel L.F. Mejdalani