Turkish Journal of Zoology

Volume 44 | Number 5 Article 9

1-1-2020

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TÜBİTAK

Turkish Journal of Zoology

http://journals.tubitak.gov.tr/zoology/

Short Communication

Turk J Zool
(2020) 44: 472-476
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doi:10.3906/zoo-2005-32

The spider *Losdolobus nelsoni* Pompozzi, 2015 – the first report of the family Orsolobidae in Uruguay (Araneae: Synspermiata)

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Received: 17.05.2020 • **Accepted/Published Online:** 26.07.2020 • **Final Version:** 14.09.2020

Abstract: The family Orsolobidae Cooke, 1965, is newly recorded for Uruguay, with the first record of *Losdolobus nelsoni* Pompozzi, 2015, a recently described species that is endemic to the Buenos Aires Province, Argentina, and herein recorded in the Rocha and Montevideo departments. The biogeographic implications of this record are commented on and some data on the phenology of the species are presented.

Key words: Arachnida, Argentina, geographic distribution, Haplogynae, peripampasic arch

The family Orsolobidae Cooke, 1965 belongs to the recently created clade Synspermiata (Michalik and Ramírez, 2014), which includes most of the haplogyne spiders. Orsolobidae is composed of small-sized, active hunting spiders, characterized by having 6 eyes; median and posterior laterals separated by their diameter or more; and 2 claws on an onychium, each claw with a double row of teeth and an elevated tarsal organ (Forster and Platnick, 1985; Izquierdo and Labarque, 2010; Murphy and Roberts, 2015). Orsolobidae is an important component of the forest litter fauna of the southern hemisphere (e.g., Forster and Platnick, 1985; Griswold and Platnick, 1987; Platnick and Brescovit, 1994; Schwerdt et al., 2014). Currently, the family Orsolobidae has 179 species and 30 genera (WSC, 2020[1]).

Around the world, the family presents a distribution that is restricted to the southern hemisphere. It is present in several old world countries (Australia, Tasmania, New Zealand, Falkland Islands, South Africa, and Malawi) (Grismado and Izquierdo, 2014; Murphy and Roberts, 2015) and in South America, the family is found in Argentina, Brazil, and Chile, and is composed of 7 genera and 40 species (WSC, 2020).

The genus *Losdolobus* Platnick and Brescovit, 1994, comprises 5 species distributed in Argentina and Brazil (Pompozzi, 2015). *Losdolobus nelsoni* Pompozzi, 2015 is a recently described species from the mountain ranges of Ventania and Tandilia in Argentina. Herein the first record of the family Orsolobidae in Uruguay was present with occurrences of the species *L. nelsoni*, based on individuals collected in Uruguay. The phenology of the species was commented on and a brief discussion was provided about the geographical distribution of this genus across the peripampasic arch.

Individuals were collected in the department of Rocha, by sampling at 4 different locations (natural field area (NFA) 34°05′2.06″S, 53°45′38.1″W; pasture system area (PSA) 34°05′26.8″S, 53°52′14.4″W; integrated agriculture area-1 (IAA1) 34°02′33.7″S, 53°50′02.7″W, and IAA2 34°24′42.2″S, 54°08′10.5″W) near the city of Castillos. Sampled environments were dominated by *Butia odorata* (Barb. Rodr.) Noblick [2011] (butia palms) and associated graminean, as the main plant species (Figures 1 and 2), and had different disturbance levels (NFA: low-grazing intensity by cattle; PSA: production area under grazing of cattle and sheep; and IAA1 and IAA2: integrated livestock production system with winter and summer agriculture). At each location, 2 series of 10 pitfall traps were placed, and each trap was separated by a distance of 10 m, and each series by 100 m.

[1] World Spider Catalog, WSC 2020. Version 21.0. Natural History Museum Bern. Website http://wsc.nmbe.ch [accessed April 08, 2020].

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Figures 1–2. Habitat: 1) Rocha, near Lechiguana hill, (34°5′26.80″S, 53°52′14.40″W); 2) same locality, detail of the microhabitat, dried leaves of *Eryngium horridum* Malme.

Each pitfall trap consisted of two 1-L polystyrene jars, where one recipient was placed inside of another. As a preservative agent, a mixture of liquid soap (1% of total volume), monoethylene glycol (12% of total volume), acetic acid (2% of total volume), and water (85% of total volume) was used. Each pitfall was replaced every 2 weeks; samplings were made between January 2015 and December 2016 (NFA; PSA), January to December 2015 (IAA1), and January to December 2016 (IAA2). For the collected individuals, the phenology of the males and females was followed. The best-preserved individuals found in traps were used as a voucher.

An additional manual search was performed to use recently collected individuals and identify the species properly. This was conducted in April 2017, where 3 experienced collectors sampled spiders for 5 h, in Rocha (34°05′1.07″S, 53°45′43.08″W), by looking manually in the leaf litter, and under the soil and spiny plants.

The collected specimens were preserved in 70% alcohol and deposited in the Colección Aracnológica de la Facultad de Ciencias, Universidad de la República (FCE-Ar), Uruguay. Pictures of the preserved male and female spiders (habitus and genitalia) were taken using a Nikon D3500 camera (Tokyo, Japan) coupled with a Nikon YS100 microscope.

In addition to the specimen sampling, the current distribution of this species was updated by comparing it to previous records (Pompozzi, 2015), and also by including specimens present in the FCE-Ar. A map was made using the SimpleMappr online tool (Shorthouse, 2010[2]). The shaded background areas referred to the Terrestrial Ecoregions of the World (TEOW), as defined by Olson et al. (2001), a biogeographic regionalization of the Earth's terrestrial biodiversity, which is defined as relatively large units of land or water containing a distinct assemblage of natural communities sharing a large majority of species. All of the collected individuals were identified as belonging to the species *L. nelsoni*. The individuals were identified by the presence of the diagnostic characters indicated by Pompozzi (2015), mainly by the morphology of the genital organs.

When evaluating the phenology in the locality of Rocha, a total of 35 individuals were found, comprising more males (n = 23) than females (n = 12). Adults of this species were more abundant during the winter and part of autumn and spring months in the 2 evaluated years (Figure 3). However, also observed was a moderate abundance during the warmer months of 2016, corresponding to spring and summer (September to December).

When the specimens were manually collected, a total of 9 adults and 2 immature spiders were found in the field, mostly associated with leaf litter and spiny plants (*Eryngium horridum* Malme).

Losdolobus nelsoni Pompozzi, 2015

(Figures 4–13)

Material examined – URUGUAY, Rocha: near Lechiguana hill, 12 km from Castillos City PSA (34°05′26.80″S, 53°52′14.40″W), 2♂, 2♀, 16/12/2016, L.F. García et al. (FCE-Ar 9209); 1♂, 27/04/2015, (FCE-Ar 9211); 2J, 06/04/2017, L.F. García, M. Lacava, A. Laborda, (FCE-Ar 9212); Navarro Hills, near Laguna Negra (NFA) (34°05′1.07″S, 53°45′43.08″W), 2♂, 1♀ 14/01/2016, L.F. García et al., (FCE-Ar 9210); Montevideo: Malvín Norte, Faculty of Sciences campus (34°52′56.57″S, 56°7′8.05″W), 1♂, 23/08/2017, D. Hagopián, (FCE-Ar 9213).

[2] Shorthouse D. (2010). SimpleMappr, an online tool to produce publication-quality point maps. [Retrieved from https://www.simplemappr.net]. Accessed: April 01, 2020.

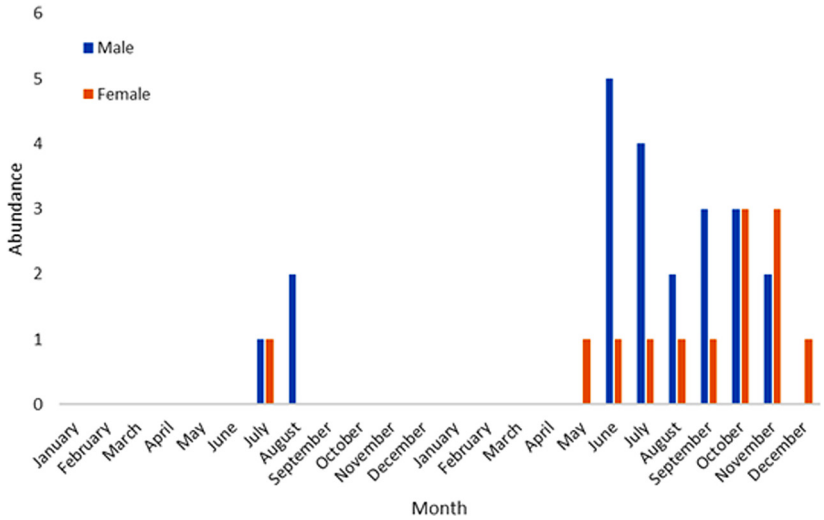
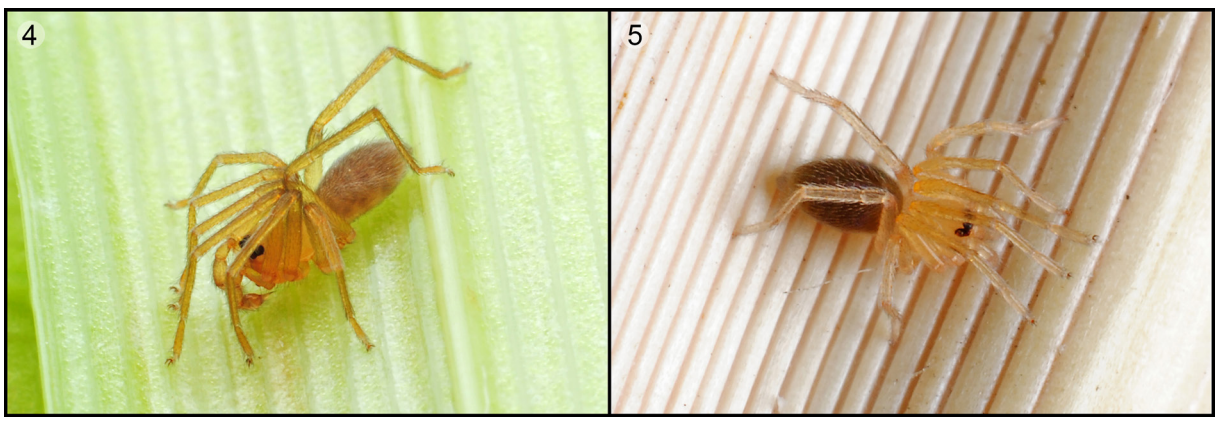


Figure 3. Phenology of the species of *Losdolobus nelsoni* Pompozzi, 2015 in the department of Rocha. Spiders were sampled with pitfall traps during 2015 and 2016.



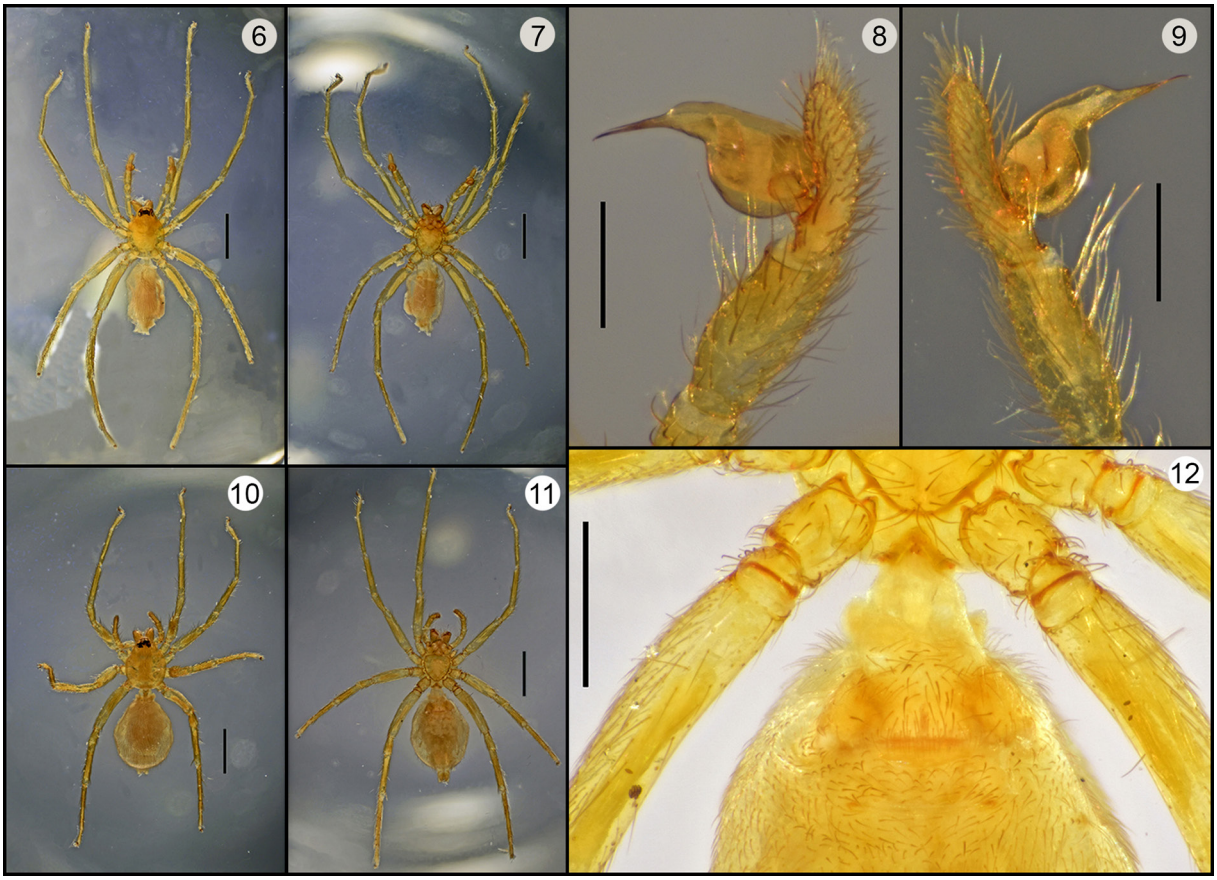
Figures 4–5. *Losdolobus nelsoni* Pompozzi, 2015; live specimens: 4) male (FCE-Ar 9213); 5) immature (FCE-Ar 9212).

Distribution (Figure 13) –Argentina, Buenos Aires Province, and Uruguay, Rocha and Montevideo departments (NEW RECORDS).

This study provided new evidence regarding the natural history and distribution of *L. nelsoni*. Observations regarding the phenology of this species, were in agreement with previous observations by Pompozzi (2015), who suggested that adults of this species were active mainly during cold months, which corresponded to the mating season. This might also have been the case for the Uruguayan populations, given that both the males and females overlapped their activity in most of the months when the species was recorded. Interestingly, a low number of individuals was found, even less than in other studies related to the phenology of the same species (see Pompozzi, 2015). This difference regarding other studies might be explained by the fact that areas with certain intervention degrees were sampled, in contrast with the previous studies where the species was collected in highly conserved regions. Interestingly, no individuals of *L. nelsoni* were sampled in agricultural fields, which might suggest that this species is susceptible to anthropic activities. However, further studies should explore the biology and ecology of *L. nelsoni* in more detail and evaluate if it could be potentially used as a bioindicator of anthropogenic disturbance, similar to other spider species.

The new records for *L. nelsoni* in Uruguay expanded the distribution range of this family to the country. Species distribution included disturbed as well as highly preserved regions, which suggested that this species can be found in environments under different intervention degrees. This corresponded with the previous record of this species in Buenos Aires Province (Pompozzi, 2015).

It is noteworthy that previous records of this species corresponded to different biomes according to the



Figures 6–12. *Losdolobus nelsoni* Pompozzi, 2015; adult male (6–9) and female (10–12) (FCE-Ar 9212): 6) habitus, dorsal view; 7) same, ventral view; 8) left male palp, ectal view (bulb is rotated); 9) same, mesal view; 10) habitus, dorsal view; 11) habitus, ventral view; and 12) epigynum, ventral view. Scale bars: 6, 7, 10, 11 = 01 mm; 8, 9 = 0.25 mm; and 12 = 0.5 mm.

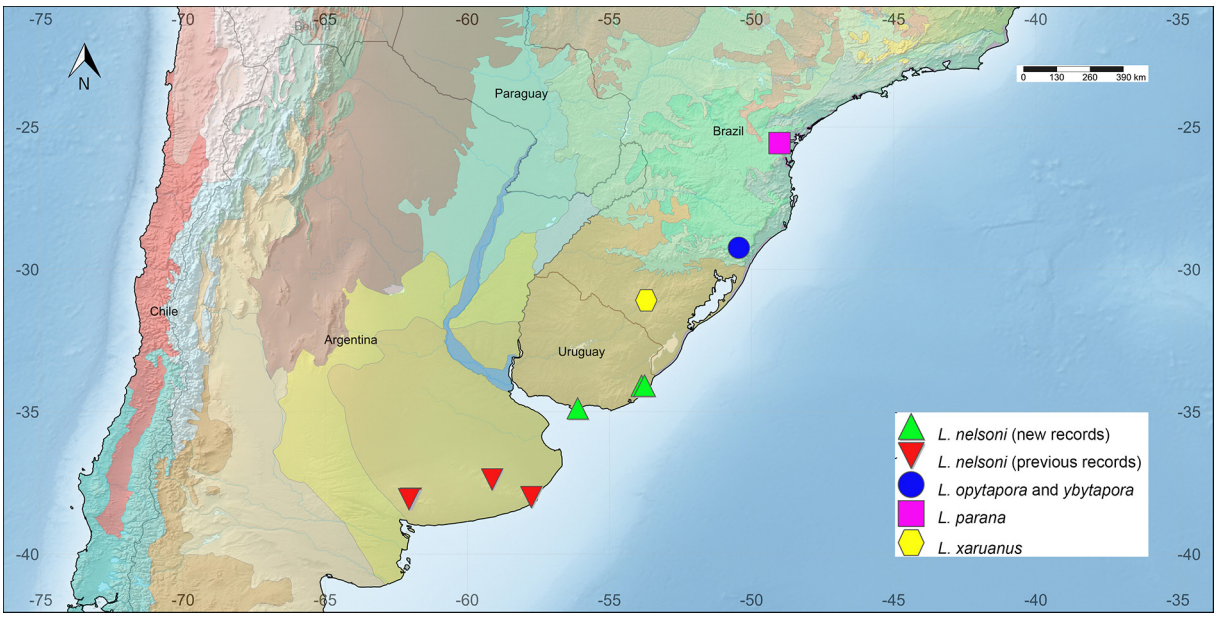


Figure 13. Geographic distribution of the genus *Losdolobus* Platnick and Brescovit, 1994 (Orsolobidae). The shaded background areas refer to the Terrestrial Ecoregions of the World (TEOW) (Olson et al. 2001).

classification of Olson et al. (2001): temperate grassland savannas (Argentina–NT08), while the species herein were collected in a subtropical grassland savannas (Uruguay–NT07), and fit in the following ecoregions: humid pampas (NT0803) and Uruguayan savanna (NT0710), respectively (Figure 13). However, 1 congeneric species, *L. xaruanus*, from Brazil, had previously been cited in this ecoregion (Lise and Almeida, 2006). All of the localities that recorded *L. nelsoni*, as well as *L. xaruanus*, belonged to the biogeographic province of Pampa (Morrone, 2001).

The hypothesis of the perimpampasic orogenic arch, proposed by Frenguelli (1950), suggested that there exists a track in the Pampa region, formed by Argentina, southern Brazil, and Uruguay. Evidence from plant and animal groups has supported this hypothesis; for example, mygalomorph spiders (Ferreti et al., 2012), scorpions (Acosta, 1993; Acosta et al., 2008), harvestmen (Acosta, 1993), and ferns (Arana et al., 2013). The current findings confirmed the trend observed for these other groups and provided new evidence reinforcing this idea, since several species of the genus *Losdolobus* could be found along the eastern part of this arch (see Pompozzi (2015): Figure 10).

Although there have been few studies supporting the use of spiders of the family Orsolobidae, these results have suggested that this family, as well as some related groups that are small and have a poor dispersal capability (e.g., Oonopidae, Tetrablemmidae or Caponiidae), can be useful as a model for biogeographical studies.

Acknowledgments

Thanks are extended to the Instituto Nacional de Investigación Agropecuaria (INIA), Uruguay, for funding the project FPTA N° 312/2012. Thanks also go to those responsible for the Fernando Ramos, Mario Cardoso, Walter Branaa, Agustín Piñeyrúa and Federico Llambí sites for their permission for taking the samples. The authors are indebted to Mariángeles Lacava for helping during the specimen sampling.

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