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First confirmed record of the genus *Cybaeodamus* (Araneae: Zodariidae) in Paraguay, with notes on its distribution

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Abstract: We provide the first confirmed record of the zodariid genus *Cybaeodamus* Mello-Leitão 1938 in Paraguay from both males and females of *C. meridionalis* Lise, Ott & Rodrigues, 2009. We illustrate the species and provide an updated map of its distribution in South America. Due to a distinct lack of sampling for spiders in Paraguay, this paper doubles the number of Zodariidae recorded in the country.
Key words: Araneae, Zodariidae, antlike spider, first record, taxonomy, pitfall trap, Paraguay.

Primer registro del género *Cybaeodamus* (Araneae: Zodariidae) en Paraguay, y notas sobre su distribución
Resumen: Proporcionamos el primer registro confirmado del género de zodáridos *Cybaeodamus* Mello-Leitão 1938 en Paraguay de machos y hembras de *C. meridionalis* Lise, Ott & Rodrigues, 2009. Ilustramos la especie y proporcionamos un mapa actualizado de su distribución en América del Sur. Debido a una clara falta de muestreo de arañas en Paraguay, el presente trabajo duplica el número de los Zodariidae registrados en el país.
Palabras clave: Araneae, Zodariidae, araña hormiga, primer registro, taxonomía, trampa de caída, Paraguay.

Introduction

The Zodariidae contains 1,168 species in 86 genera (World Spider Catalog, 2020), and are particularly interesting from an ecological perspective as many species are myrmecophagous (Jocqué & Dippenaar- Schoeman, 2007).

Paraguay contains multiple distinct and biologically diverse habitat types including Cerrado, humid and dry Chaco, Atlantic Forest and Pantanal (Olson *et al*., 2001). Yet, in comparison to its South American neighbours it is woefully understudied e.g. Cerambycids (Pett, 2019), Sphingids (Smith et al. 2017).

The neotropical genus *Cybaeodamus* Mello- Leitão, 1938, was revised by Lise, Ott & Rodrigues (2009) to contain seven species. Dankittipakul, Jocqué & Singtripop (2012) transferred an eighth species, *Cybaeodamus lentiginosus* (Simon, 1905) from *Storena* Walckenaer, 1805. The genus therefore currently contains eight nominal species. *Cybaeodamus* is diagnosed as having two tegular apophyses, with the distal one large and complex.

In this paper, we document with illustrations, the first confirmed record of the genus *Cybaeodamus* in Paraguay, from males and females captured during a pitfall trap study.

Materials and methods

Specimens were caught during an ongoing pitfall trap project. Plastic cups of 15 cm depth and 12 cm radius were sunk into the ground, each sample set consisted of five such traps, filled to a depth of 7cm with a 10% formaldehyde solution.

Specimens were sorted to taxonomic order (then families) for ongoing projects on target taxa and preserved in 70% ethanol. Zodariidae specimens were examined with an AmScope SM-2TZZ stereo microscope and identified using taxonomic literature (Jocqué, 1991; Lise, Ott & Rodrigues, 2009).

Specimen photographs for the image plate were taken using a Nikon D3500 digital camera mounted onto an AmScope 2TZZ stereo microscope with an adaptor, 5-6 images stacked using the software HeliconFocus 6.7 and combined together using GIMP (www.gimp.org).

CIPLT-Ar: Collección Invertebrados Para La Tierra- Aracnologiá
Co-ordinates of field sites mentioned in text (decimal degrees, taken using GPS unit Garmin 64): Estancia Santa Ana- -26.851, -58.043, Military Base- -26.841, -58.308; Encarnación- -27.286, -55.931.

Results

Cybaeodamus Mello- Leitão 1938

Cybaeodamus meridionalis Lise, Ott & Rodrigues, 2009
Fig. 1, 2.

MATERIAL EXAMINED*:* ÑEEMBUCÚ (11 specimens): 1♂ Estancia Santa Ana, 23.XI.2019, pitfalls (20m forest Bi), Brogan Pett & Rufus Wyer leg, CIPLT-Ar 0272 ;1♂ Estancia Santa Ana, 23.XI.2019, pitfalls (20m forest edge Bi), Brogan Pett & Rufus Wyer leg, CIPLT-Ar 0273 ; 1♂ Estancia Santa Ana, 23.XI.2019, pitfalls (grassland Bi), Brogan Pett & Rufus Wyer leg, CIPLT-Ar 0274 ; 1♂ Estancia Santa Ana, 23.XI.2019, pitfalls (60m forest Bi), Brogan Pett & Rufus Wyer leg, CIPLT-Ar 0277 ; 2♂ 1♀ Military Base, Pilar, 24.XI.2019, pitfalls (20m road Bii), Brogan Pett & Rufus Wyer leg, CIPLT-Ar 0280 ; 1♂ Estancia Santa Ana, 23.XI.2019, pitfalls (20m forest Bi), Brogan Pett & Rufus Wyer leg, CIPLT-Ar 0288 ; 1♂ Estancia Santa Ana, 10.XII.2019, pitfalls (grassland/ forest edge Aii), Brogan Pett & Rufus Wyer leg, CIPLT-Ar 0289 ; 1♂ 1♀ Estancia Santa Ana, 12.II.2020, pitfalls (forest edge Cii), CIPLT-Ar 294; ITAPUÁ (1 specimen) : ♂ Encarnación, XI.2019, garden, Paul Smith leg, CIPLT-Ar 0290.

DIAGNOSIS*:* The males are recognised from others in the genus by having a larger distance between the apex of the tegular distal apophysis and the median tegular apophysis (Fig.1B). Females recognised by a patch of serrate setae on ventral surface of the abdomen and short copulatory ducts (Fig.1D).

COMMENTS*:* This species is the most widely distributed in the genus, with specimens ranging from north- western Argentina (Salta), to south- eastern Brazil (Rio Grande do Sul)- and north to central Brazil (Brasilia). Here, we fill a gap between distribution records and provide first records of the genus in Paraguay (Fig.2). Interestingly, due to the nature of our pitfall project, we are able to make inferences about the species' ecology.

Between the two field sites of this project, specimens were found at substantially higher abundances in one (an estancia 25 km outside the city of Pilar) versus the other (a military training base in the outskirts of Pilar).Within our pitfall habitat classifications, *C. meridionalis* specimens were found at each of our pitfall habitats: forest interior, 20m into the forest (from edge site), grassland/ forest edge, and open grassland. Our sampling regime consisted of over 5,000 trap nights. *Cybaeodamus meridionalis* was more abundant at forest edge sites in our samples but utilised all available habitats at this site.

The military base in our sampling regime sits within a small city and is bordered along its west coast by the Rio Paraguay. There is a greater variety of natural vegetation, and a higher diversity of distinct natural habitat types at the estancia site.

The last interesting aspect about the species ecology we are able to ascertain is the single specimen found in an urban yard in Itapuá department (south- east), in the Atlantic Forest ecoregion. This record further enhances our knowledge on the species in Paraguay (likely widespread).

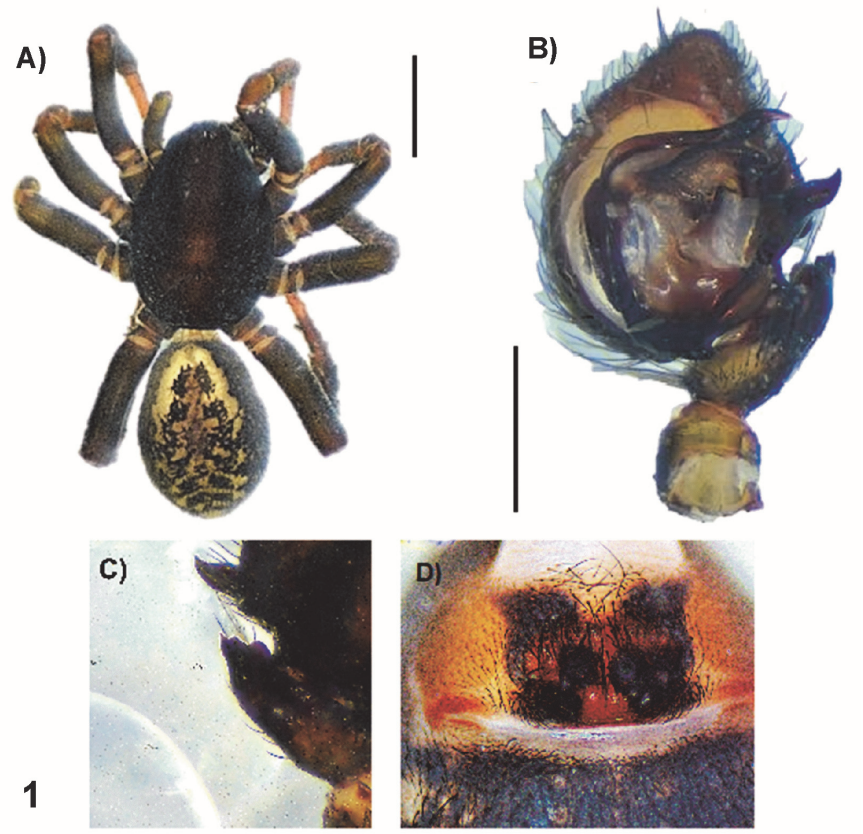

Fig. 1. *Cybaeodamus meridionalis*. A- Dorsal habitus ♂. B- Male palp ventral view. C- RTA ♂. D- External appearance of female epigyne. Note. Scale bars A= 2mm, B= 0.5mm

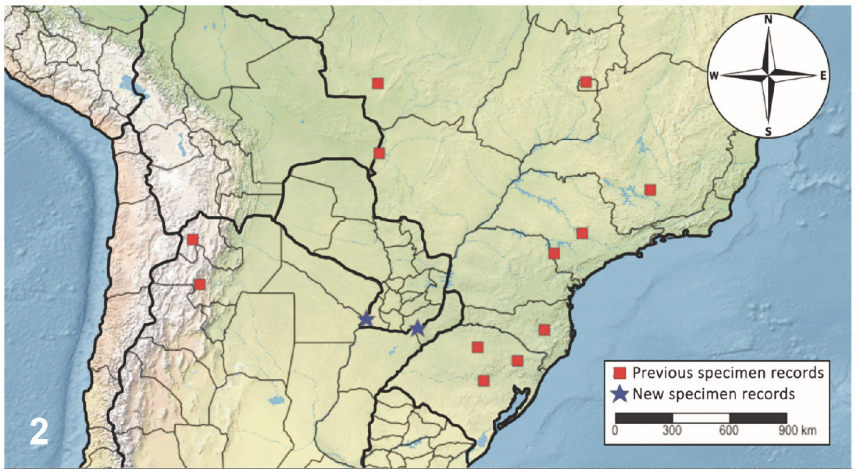

Fig. 2. Distribution map of *Cybaeodamus meridionalis*. Red squares represent previous specimen records (Lise, Ott & Rodrigues, 2009), and blue stars indicate the new records for Paraguay presented here. (Map created in https://www.simplemappr.net/)

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