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Scientific Note

Lestrimelitta chacoana Roig-Alsina, 2010 (Hymenoptera: Apidae) in a Semideciduous Atlantic Forest, Southern Brazil

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Abstract. The species of the cleptobiotic bee genus *Lestrimelitta* Friese, 1903 (Hymenoptera: Apidae) are generally known as a menace to Meliponiculture and Apiculture, that is why it is common to observe recommendations to beekeepers to avoid the proximity of their meliponaries with any *Lestrimelitta* hives. So, besides other anthropic pressures, the growth of beekeeping may represent a particular threat to its species. In this note we address the distribution of three species recorded in the triple border region of Argentina, Paraguay, and Brazil. One of these species, *Lestrimelitta chacoana* Roig-Alsina, 2010 (Hymenoptera: Apidae), previously described from the Argentinian Dry Chaco, is recorded for the Semideciduous Atlantic Forest in Southern Brazil where it was already expected to be found due to its previous record in a contiguous forest type in Northeastern Argentina. A discussion about the characters to differentiate it from two other species is made.

Keywords: Biogeography; iratim; robber bees; Semideciduous Seasonal Forest; Upper Paraná Atlantic Forest.

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The stingless bees of the genus *Lestrimelitta* Friese, 1903 (Hymenoptera: Apidae) have eusocial and also cleptobiotic behavior, therefore, obtaining resources by raiding other social bees, mainly in other Meliponini or *Apis mellifera* L., 1758 (Hymenoptera: Apidae) hives (Michener 2007). The genus gathers 24 described species and occur from Argentina and south Brazil to Mexico (Gonzalez & Griswold 2012).

Due to their cleptobiotic behavior *Lestrimelitta* species usually pillage other honey bees and became known by its menace to Meliponiculture (the activity of breeding of stingless bees) and Apiculture. The attack can even lead to the dead of the victim colony (Santana *et al*. 2004). Hence, recommendations to beekeepers are often observed in order to avoid the proximity of their meliponaries with hives of *Lestrimelitta* species (Witter & Nunes-Silva 2014).

Further, as the diversity of this genus is marked, with many species recently described, and some possibly with limited distributions, it seems reasonable that, similarly to other Meliponini, their species are also fragile to anthropic impacts due to fragmentation and loss of habitats (Freitas *et al*. 2009; Arena *et al*. 2018). We emphasize the lack of conservation studies for this group and the relevance of expanding the knowledge about the distribution of these species.

In a taxonomic review of the Brazilian species of *Lestrimelitta*, Marchi & Melo (2006) listed 14 species, two of them with records near the western region of Paraná state, part of the triple border region of Brazil, Argentina (Misiones) and Paraguay (Alto Paraná). The nearest record of *Lestrimelitta rufipes* Friese, 1903 and *Lestrimelitta sulina* Marchi & Melo, 2006 was in Nova Teutônia, west portion of Santa Catarina State not far from to the western region of Paraná State (285 Km from the city of Foz do Iguaçu), from where we examined additional specimens.

Lestrimelitta rufipes has a wider distribution over the country being Nova Teutonia its southernmost record, and *L. sulina* display a narrower distribution being restricted to the southern Brazil with more records on the east portion of Paraná, Santa Catarina and Rio Grande do Sul States.

Nonetheless, following Alvarez & Lucia (2018), *L. rufipes* was noted in Misiones province, Argentina (in Deseado, Loreto, Montecarlo, Parque Nacional Iguazu, and San Inácio). These localities belong to the Upper Paraná Atlantic Forest ecoregion that holds the semideciduous seasonal forest as their dominant forest type (Di Bitetti *et al*. 2003). This ecoregion encompasses the triple border between Argentina, Paraguay and Brazil. Alvarez & Lucia (2018) also commented regarding *L. rufipes* records in an area apparently disjointed in the slope of the Andes (Salta and Jujuy) and Gonzalez *et al*. (2010) cites it for Peru.

For its part, *L. sulina* was cited as occurring in Argentina by Camargo *et al*. (2023), with no detail on the locality of the record, but its occurrence in that country was further considered uncertain by Alvarez & Lucia (2018). Camargo *et al*. (2023) also included the Alto Paraná department (Paraguay) as its distribution area. This department is neighbor of Misiones (Argentina) and Paraná State (Brazil), and part of the Upper Paraná Atlantic Forest ecoregion.

The third species listed as occurring in the triple border region is *Lestrimelitta chacoana* Roig-Alsina, 2010. This species was described based on specimens collected from three localities from Chaco province, Northern Argentina and other specimens from Santa Fé (Argentina). Both of these places are somewhat far from the triple border, in or near the dry Chaco region of northern Argentina. Its distribution was further expanded based on records from many localities of Misiones (Argentina) (Alvarez & Lucia 2018; Alvarez *et al*. 2018). Lima & Silvestre (2017) cited it for the first time from Brazil, in Porto Murtinho, Mato Grosso do Sul state, close to the paraguayan border (Lima & Silvestre 2017), a region that has the only area of Chaco Biome in the country. Engel (2022) recorded it from Villarica, Paraguay and Jujuy, Argentina, and recently, during the final revision of the present contribution, Melo (2023) recorded two workers from Foz do Iguaçu, PR. Therefore, we do not have records of *L. rufipes* for Paraguay and of *L. sulina* for the Argentina, according to Alvarez & Lucia (2018).

Here we examined a whole sample of 19 workers bees of *Lestrimelitta* collected in Foz do Iguaçu, Paraná state. These samples were from three hives (11 workers) located in the in the "Refúgio Biológico Bela Vista" (Foz do Iguaçu, Brazil - Itaipu Binacional) and eight were collected during a raid to *Tetragonisca fiebrigi* (Schwarz, 1938) nests as noted forward (abbreviations as follows: CEDU-UNILA= Coleção Entomológica Danúncia Urban, Universidade Federal da Integração Latino-Americana, Foz do Iguaçu, PR). Images were taken with a Zeiss Discovery V12 stereomicroscope attached to an Axiocam 105 camera and the map was made with the online application simplemappr.net.

Examined material. (all workers): Brasil, PR: 2, Foz do Iguaçu, RBV [Refúgio Biológico Bela Vista], Administração, -25.449184, -54.554535, 16/12/2021, J. Colombelli & Y. Delky leg. (CEDU-UNILA). 6, *ibidem*, -25.448954, -54.554054, ninho 2, 05/05/2022, J. Colombelli & Y. Delky *leg*. (CEDU-UNILA). 3, Foz do Iguaçu, RBV, Pomba-Cuê, -25.454417 -54.527363, ninho 1, 05/05/2022, J. Colombelli & Y. Delky (CEDU-UNILA). 8, Foz do Iguaçu, -25.477077, -54.576204, 01/VII/2021, F. Zanella leg. (CEDU-UNILA), "em ataque ninho Jatai".

The workers have the opening of the propodeal spiracle with an oval contour (ovoid), only 2 to 3 times longer than wide; vertex with few very short and slender erect setae; lack of erect setae on the mesoscutum disc. Following the dichotomic key presented by Marchi & Melo (2006) these characters lead us to the 6th dilemma where *L. rufipes* and *L. sulina* are distinguished. The former species have propodeal spiracle elongated and narrow while the later have vertex with dense, stout and erect setae and the whole mesoscutum area uniformly haired.

In the 6th dilemma, as observed by Roig-Alsina (2010), *L. chacoana* do no find correspondence in neither of the alternatives as it has short hairs in the two superior thirds of mesepisternum, and the few erect and extremely short setae in the dorsolateral sides of the first metasomal terga. The same characters lead to *L. chacoana* in the identification key of Engel (2022).

The antero-dorsal margin of the propodeal spiracle projected over the spiracle opening in such a way to form a lobe (Figure 1) was mentioned by Roig-Alsina (2010) and considered by Engel (2022) as diagnostic of the subgenus *Lestrimelitta s. str.* This lobe, in lateral view, is large enough to almost hide the spiracle opening (Figure 8 in Roig-Alsina 2010), or at least more than its upper half. But in latero-posterior view, the spiracle ovoid opening is still visible specially in its inferior portion. The presence of short and decumbent plumose pilosity only close to the propodeal spiracle, on the upper and anterior part, and with relatively fine and homogeneous simple hairs on the sides of the propodeum, showing the integument (Figure 1), is in accord with the original description of *L. chacoana*.

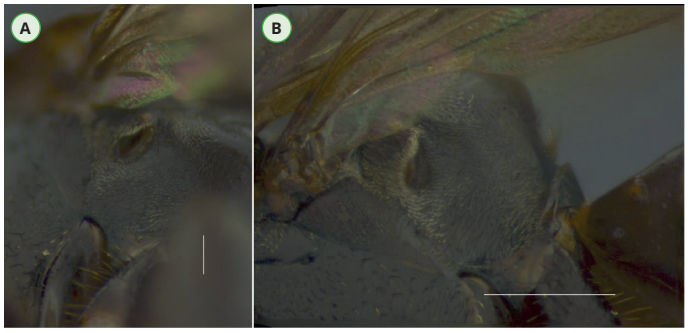

Figure 1. *Lestrimelitta chacoana*, worker: Propodeum, lateral area. A. latero-posterior view, see the ovoid spiracle, scale=0.2 mm. B. Lateral view, scale=0.5 mm.

Here we present records of *L. chacoana* in areas with semideciduous seasonal forest in Southern Brazil. Engel (2022) stressed the distribution of this species in the Chaco region, but the present record as well those from Misiones, Argentina made by Alvarez & Lucia (2018) (Figure 2) reinforce the broad and consistent records in areas with semideciduous seasonal forests of the Upper Paraná Atlantic Forest ecoregion, far from the Dry Chaco, from where the species was originally described (Roig-Alsina 2010). Regarding the distribution of *L. chacoana* in Brazil it is possible that the species occurrence coincides with the largest part of the Upper Paraná Atlantic Forest ecoregion. This note reinforces the need for further sampling efforts to clarify the sympatry levels with other species of the genus found to occur in the area of the triple border.

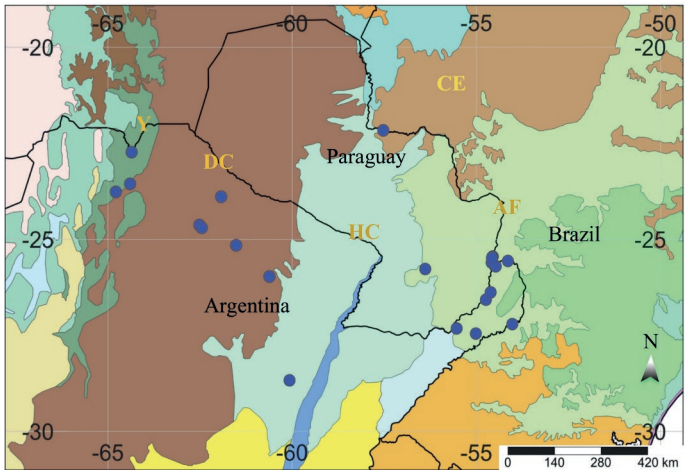

Figure 2. Geographical records of *Lestrimelitta chacoana* in southern South America. Ecoregions areas according to Olson *et al*. (2001) indicated by colors: Yungas (Y), Dry Chaco (DC), Humid Chaco (HC), Upper Paraná Atlantic Forest (AF), Cerrado (CE).

TAXONOMIC AUTHORITIES

Lestrimelitta chacoana Roig-Alsina, 2010 [original description] in Roig-Alsina (2010); *Lestrimelitta s. str*. Friese, 1903 in Friese (1903).

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AUTHORS CONTRIBUTION

JAC: Survey and initial writing, YDI-O: Survey, GSS: Final writing, FCVZ: Identification, revision and final writing. All authors read and approved the final manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no competing interests.

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