





Mutillidae at PARNA Grande Sertão Veredas, in Cerrado area, Minas Gerais, Brazil

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Abstract

The Cerrado is home to high biodiversity, high rate of endemic and endangered species, but the biome is threatened by various human activities. Therefore, it is considered a global *hotspot*, being a priority area for conservation on the planet. This condition justifies studies to better understand the biodiversity, distribution and occurrence of different taxon, such as solitary wasps of the Mutillidae family (Hymenoptera). Therefore, the objective of this work is to report the occurrence of Mutillidae in the Parque Nacional Grande Sertão Veredas, in Cerrado area. The occurrence of 18 species and morphospecies of seven genera of Mutillidae was recorded. The most abundant species was *Traumatotutilla bifurca*, and there is also a new record for the state of Minas Gerais of *Traumatotutilla ipanema*, which, together with the community sampled, this strengthens the park's role in conserving the biodiversity of the Mutillidae family in Cerrado areas.

Keywords: Biodiversity, brazilian savanna, Conservation United, sizzle ant; *Traumatotutilla* ssp.

Mutillidae no PARNA Grande Sertão Veredas, em área de Cerrado, Minas Gerais, Brasil

Resumo

O Cerrado abriga elevada biodiversidade, altas taxas de endemismo e espécies ameaçadas de extinção, entretanto o bioma é ameaçado por diversas atividades humanas. Por isso, é considerado um *hotspot* global, sendo uma área prioritária para a conservação no planeta. Essa condição justifica a realização de estudos para melhor compreender a biodiversidade, distribuição e ocorrência de diferentes táxons, como as vespas solitárias da família Mutillidae (Hymenoptera). Portanto, o objetivo deste trabalho é relatar a ocorrência de Mutillidae no Parque Nacional Grande Sertão Veredas, em área de Cerrado. Foi registrada a ocorrência de 18 espécies e morfoespécies de sete gêneros de Mutillidae. A espécie mais abundante foi *Traumatotutilla bifurca*, e há também um novo registro para o estado de Minas Gerais de *Traumatotutilla ipanema* que juntamente com a comunidade amostrada, reforça o papel do parque na conservação da biodiversidade da família Mutillidae em áreas de Cerrado.

Palavras-chave: Biodiversidade, formiga chiadeira, Savana brasileira, Unidade de Conservação, *Traumatotutilla* ssp.

Introduction

The Cerrado, the second-largest Brazilian biome in terms of territorial expanse, now encompasses a mere 12.5% of its original extent, with a meager 3.1% nestled within Full Protection Conservation Units (CUs) and 5% within sustainable use CUs (Bolson, 2018). This biome, besieged by diverse anthropogenic activities, harbors a rich tapestry of biodiversity, marked endemism, and species teetering on the brink of extinction. As a result, it assumes the stature of a global *hotspot*, signifying its critical prioritization for planetary conservation efforts (Strassburg et al., 2017). This exigency

underscores the imperative for nuanced investigations aimed at elucidating the intricacies of biodiversity, taxonomic distribution, and occurrence dynamics of various taxa. In this context, the solitary wasps belonging to the Mutillidae family (Hymenoptera) warrant particular attention (Aranda & Catian, 2008), as they represent a relatively underexplored taxonomic group on a global scale (Marchiori, 2022), thus warranting the dissemination of insights regarding their distribution and occurrence patterns.

These insects are colloquially known in Brazil as "formiga veludo," "formiga de ouro," or "formiga feiticeira"

(Aguiar, Diniz, Cambaia, & Carvalho, 2016). They exhibit a characteristic sexual dimorphism, with males typically being winged and females apterous (Brothers, Fernandes, & Sharkey, 2006). Primarily functioning as larval parasitoids, targeting other wasps and bees, they wield a pivotal role in fostering ecological equilibrium within terrestrial ecosystems (Wilson, Williams & Pitts 2010).

These wasps inhabit diverse Brazilian biomes (Morato, Amarante, & Silveira, 2008), with the country hosting approximately 440 species, including 98 endemics (Bartholomay, 2023). More than 50 species have been recorded in the Cerrado, but there is little information about this biome in the state of Minas Gerais (Aranda & Gracioli, 2016), even within Conservation Units deemed pivotal for invertebrate conservation, such as the Parque Nacional Grande Sertão Veredas (PARNA GSV) (Silva & Araújo-de-Almeida, 2013). Consequently, the current endeavor seeks to chronicle the presence of Mutillidae within the Cerrado biome, specifically within this Conservation Unit.

The record took place in the PARNA GSV (15° 6' S 45° 48' 59" W), with a total area of 230,853.4200 hectares, in the municipality of Chapada Gaúcha, north of the state of Minas Gerais, in the period of September 2022 to April 2023, totaling 24 field days.

Mutillidae specimens were randomly collected by active search, via manual collection, with the use of tweezers, and through entomological nets, moving along pre-existing trails and roads in different phytogeographies of the Cerrado domain, such as *Veredas*, cerrado *sensu stricto*, *Campo Limpo* and Gallery Forest, completion of another project to inventory wasp taxa. After collection, the specimens were stored in 70% alcohol and sent to the Zoology Laboratory of the Instituto Federal de Educação, Ciência e Tecnologia do Sul de Minas (IFSULDEMINAS) -campus Inconfidentes, Minas Gerais, Brazil. After that, they were identified by Dr. Pedro Reck Bartholomay from Instituto de Pesquisa da Amazônia (INPA), and trademarks registered in the Biological Collection of Social Wasps of IFSULDEMINAS -campus Inconfidentes (CBVS).

The occurrence of 18 species and morphospecies of seven genera of Mutillidae were registered (Table 1). This richness can be considered high, since the records were random sampling, which justifies future studies focused on this taxon, using appropriate methodologies for collecting males, through Malaise traps (Auko & Silvestre, 2013), and Pitfall Traps for females (Aranda & Catian, 2008). In addition, a greater sampling effort by active search to collect both sexes will allow us to better understand the composition of the Mutillidae community in the PARNA GSV.

The genus *Traumatotutilla* André, 1901 was recorded as having the highest richness index, with eight distinct species. This characteristic is in harmony with the status of this huge genus within the Neotropical Hymenoptera (Williams, Bartholomay, & de Oliveira, 2017). Among these, *Traumatotutilla bifurca* (Klug, 1821) stands out as the most abundant, with 17 individuals. This can be explained due to its widespread presence in Brazilian biomes, including the Caatinga, Amazonia and Cerrado, recorded in 12 states,

including Minas Gerais (Williams, et al., 2017; Bartholomay, 2023).

Table 1. Species and morphospecies of Mutillidae collected in PARNA GSV, Minas Gerais, Brazil.

Specie	Abundance
<i>Cephalomutilla proxima</i> (Smith, 1879)	1
<i>Darditilla</i> sp. 1	1
<i>Darditilla</i> sp. 2	4
<i>Hoplomutilla gigantea</i> (Perty, 1833)	1
<i>Hoplomutilla goyazana</i> (André, 1898)	2
<i>Hoplomutilla</i> cf. <i>macrogastra</i>	1
<i>Leucospilomutilla cerbera</i> (Klug, 1821)	1
<i>Suarezitilla centrolineata</i> (André, 1906)	1
<i>Tallium festivum</i> (Smith, 1855)	4
<i>Timulla</i> sp.	1
<i>Traumatotutilla</i> sp. grupo <i>inermis</i>	2
<i>Traumatotutilla bifurca</i> (Klug, 1821)	17
<i>Traumatotutilla ipanema</i> (Cresson, 1902)	1
<i>Traumatotutilla juvenilis</i> (Gerstaecker, 1874)	1
<i>Traumatotutilla</i> cf. <i>moesta</i>	1
<i>Traumatotutilla quadrum</i> (Klug, 1821)	1
<i>Traumatotutilla vidua</i> (Klug, 1821)	2
<i>Traumatotutilla</i> cf. <i>vidua</i>	1

Traumatotutilla ipanema (Cresson, 1902) is a new record for the state of Minas Gerais, which until then had occurred only in the state of Mato Grosso, in Chapada dos Guimarães, an area also included in the Cerrado biome (Bartholomay, 2023) (Figure 1). This discovery reinforces the role of the PARNA GSV as a bastion of biodiversity protection in the Brazilian Cerrado.

Given the imminent threat of rapid decline in the Cerrado biome, urgent efforts towards comprehensive inventory studies are needed. These efforts aim to unravel the occurrence, distribution and situation of risk of extinction of Mutillidae species throughout the Brazilian Cerrado. Notably, visible gaps persist in the IUCN (iucnredlist.org) and ICMBio (salve.icmbio.gov.br) databases, covering threat status data for this family of wasps for all national biomes.

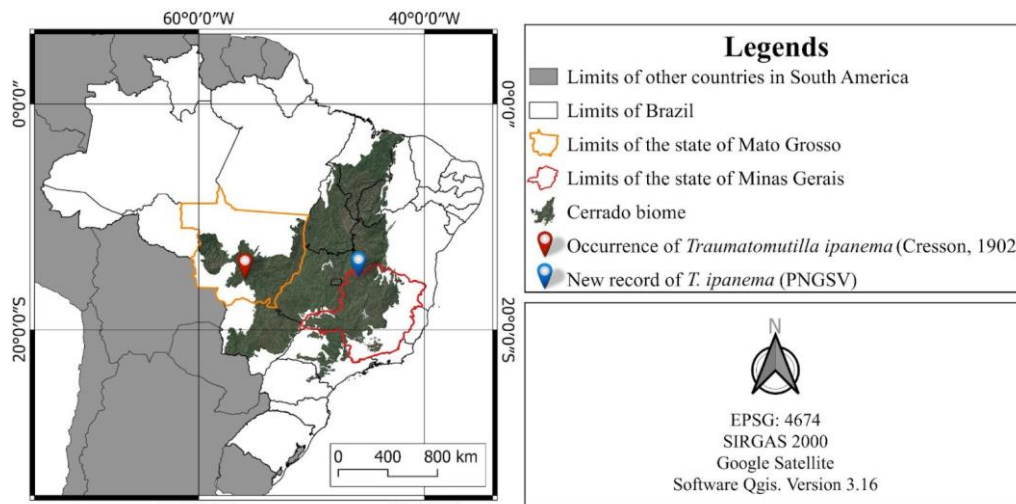


Figure 1. Geographic occurrence of *Traumatotutilla Ipanema* in Brazil.

The most abundant species in the PARNA GSV was *Traumatotutilla bifurca* and there is also a new record for the state of *Traumatotutilla ipanema*, which, together with the sampled community, strengthens the role of the park for the conservation of the biodiversity of the Mutillidae family in areas from Cerrado.

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