



Conservation

Non-volant mammals of the Maracaju Mountains, southwestern Brazil: composition, richness and conservation

Mamíferos no voladores de la sierra de Maracaju, suroeste de Brasil: composición, riqueza y conservación

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Abstract

We report the results of the non-volant mammal survey at the Maracaju Mountains located in the central region of Mato Grosso do Sul State, southwestern Brazil. The sampling encompasses different vegetation types of the Cerrado domain that occur in the region. The mammal survey was conducted by the use of pitfalls (1804 bucket-nights), live traps (7508 trap-nights), direct observation and indirect evidence (624 hours of observations). Fifty-eight non-volant mammal species of 9 orders and 20 families were recorded, representing 12% of the Brazilian terrestrial mammal species. The non-volant mammal community of Maracaju Mountains is typical of the Cerrado, but some species found occur in other domains, especially from Pantanal, Atlantic and Amazonian Forests. Among the recorded species, 11 are threatened in Brazil or on a global scale. Therefore, the Maracaju Mountains have a high richness of mammals with endangered and rare species that are still present in the extensive natural areas which persist in the region. These areas are very important for conservation of mammals and should be considered relevant areas for the establishment of Conservation Units in Cerrado and in the Mato Grosso do Sul State.

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Keywords: Cerrado; Conservation; Pantanal; Species richness; Threatened species

Resumen

Se presentan los resultados del inventario de mamíferos no voladores en la sierra de Maracaju, que se encuentra en la región central del estado de Mato Grosso do Sul, en el suroeste de Brasil. El muestreo abarca diferentes tipos de vegetación en la región del Cerrado. El inventario de mamíferos se llevó a cabo mediante el uso de trampas de caída (1804 trampas/noche) y trampas Sherman y Tomahawk (7508-trampas/noche); también se utilizaron datos de observación directa y rastros (624 horas de observaciones). Se registraron 58 especies de mamíferos no voladores de 9 órdenes y 20 familias, lo que representa el 12% de las especies de mamíferos terrestres brasileñas. La comunidad de mamíferos no voladores de la sierra de Maracaju es típica del Cerrado, pero contiene especies que se presentan en otros biomas, especialmente en el Pantanal, Mata Atlántica y Floresta Amazónica. Entre las especies registradas, 11 están amenazadas en Brasil o a una escala global. Así, la sierra de Maracaju tiene una alta riqueza de mamíferos con especies amenazadas y raras que todavía están presentes en los extensos espacios naturales que persisten en la región. Estas áreas son muy importantes para la conservación de los mamíferos y se deben considerar como pertinentes para la creación de unidades de conservación en el Cerrado y en el estado de Mato Grosso do Sul.

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Palabras clave: Cerrado; Conservación; Pantanal; Riqueza de especies; Especies amenazadas

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Introduction

The Cerrado and Pantanal are included in the so-called diagonal of open formations or corridors of xeric vegetation, which includes the much drier Caatinga, in northeastern Brazil, and the Chaco domain, in parts of Paraguay-Bolivia-Argentina. This corridor runs between the 2 main domains of moist forest of tropical South America: Amazonian forest in the north and northwest and Atlantic Forest in the east and southeast (Oliveira-Filho & Ratter, 2002).

The Cerrado and Pantanal occupy most of the territory of Mato Grosso do Sul State, and so the most of the mammal fauna is composed of species typical of these domains (Cáceres, Carmignotto, Fischer, & Santos, 2008). However, Atlantic and Amazonian Forests also play an important role on the biogeography of Cerrado mammals, especially on forest formations (Carmignotto, 2005; Costa, 2003; Johnson, Saraiva, & Coelho, 1999). Also, in the Cerrado of Mato Grosso do Sul, occur Amazonian species, such as *Oecomys paricola*, *O. mamorae* and *Proechimys longicaudatus*, and Atlantic species, such as *Akodon montensis*, *Oecomys catherinae* and *Cavia fulgida* (Cáceres, Carmignotto, et al., 2008). Additionally, the Chaco and Chiquitano forests (Zanella, 2011) also influence the mammal composition in the state of Mato Grosso do Sul, especially on the western edge of the Pantanal (Rodrigues, Medri, Tomas, & Mourão, 2002), in the proximities of Paraguay and Bolivia countries. In Mato Grosso do Sul, the Chiquitanean species *Marmosops ocellatus*, *Aotus azarae*, *Callicebus pallescens*, *Mico melanurus* and *Urosciurus spadiceus* occur only in the western edges of Pantanal, while *Cryptonanus chacoensis*, *Akodon toba* and *Oligoryzomys chacoensis*, which are Chacoan species, and have broader distributions in the High Paraguay River Basin (Cáceres, Carmignotto, et al., 2008).

The state of Mato Grosso do Sul presents 151 species of mammals distributed in 10 orders and 29 families, with 90 species of non-volant mammals and 61 species of bats (Cáceres, Carmignotto, et al., 2008). Despite this high species richness, few studies on non-volant mammal communities have been conducted in the State (Bordignon, Cáceres, França, Casella, & Vargas, 2006; Cáceres, Bornschein, Lopes, & Percequillo, 2007; Cáceres, Carmignotto, et al., 2008; Cáceres, Nápoli, Casella, & Hannibal, 2010; Cáceres, Godoi, Hannibal, & Ferreira, 2011; Godoi, Cunha, & Cáceres, 2010; Mauro & Campos, 2000; Rodrigues, Medri, et al., 2002). Therefore, there is a gap in the knowledge on mammal species composition and distribution in this portion of southwestern Brazil (Eisenberg & Redford, 1999; Vieira & Palma, 2005). The majority of the species lists of non-volant mammals available for the state come from the Pantanal wetland (Rodrigues, Medri, et al., 2002) and some mountainous regions in the surroundings of Pantanal, like Urumum mountains (Cáceres et al., 2011; Godoi et al., 2010; Mauro & Campos, 2000), Bodoquena mountains (Cáceres, Bornschein, et al., 2007) and regions of Aporé and Sucuriú rivers, in the northeastern of the state (Bordignon et al., 2006). Beyond these areas, in Mato Grosso do Sul State, there another important region for mammal conservation, the Maracaju Mountains, an extensive mountainous region of Cerrado located in the east-

ern border of Pantanal. These mountains still present great extensions of preserved natural areas and despite their importance to mammal conservation in southwestern Brazil, their mammal diversity and composition are still poorly known. Therefore, the main objective of this paper is to present the composition of non-volant mammal communities of the Maracaju Mountains, and contribute to the knowledge of mammalian fauna in a biogeographically important and poorly known region of the Cerrado. Additionally, we provide data on the frequency of occurrence of species in the region and the role of adjacent phyto-geographic domains on the regional species composition.

Materials and methods

Study area

The Maracaju Mountains (23°15'S, 55°31'W; 17°34'S, 54°45'W) are located in the central region of Mato Grosso do Sul State, dividing it in the north-south direction, acting as a watershed between High Paraguay River Basin, to the west, and High Paraná River Basin, to the east (Fig. 1). The mountains average 900 m in altitude. They are located in the core area of the Cerrado domain in the southern part, being covered by the physiognomies of *cerradão* (arboreal savannas), *cerrado sensu stricto* (shrubland savannas), seasonal forests, riparian forests and *veredas*, a riparian formation dominated by Buriti palms (*Mauritia flexuosa*) (Foster, Pott, & Salis, 2000). The vegetation of this region presents great anthropogenic influence due to cattle farms, *Eucalyptus* and sugar-cane plantations, and the natural remnants are fragmented and located in a matrix constituted of exotic grasses. However, in many regions there are portions that have continuous areas of preserved habitats, especially on the slopes of mountains (Harris et al., 2006; Sano, Rosa, Brito, & Ferreira, 2010). The climate of the region is tropical sub-humid (Aw), according to the Köppen classification, with wet (October to March) and dry (April to September) seasons

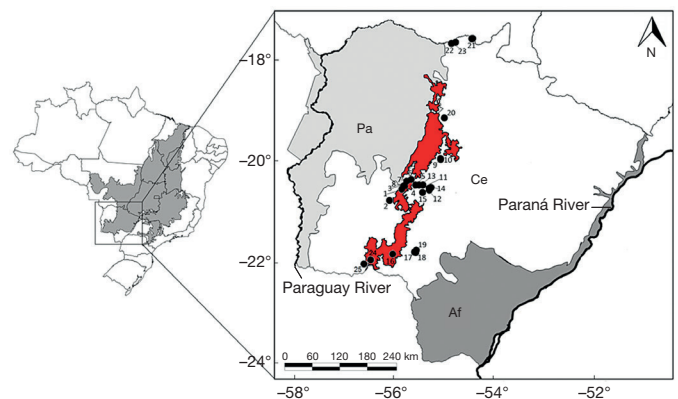


Figure 1. Map showing Brazil and Cerrado domain (shaded area) and the 25 localities sampled in the Maracaju Mountains and surroundings, state of Mato Grosso do Sul, southwestern Brazil, during the period of 2006 to 2010. In detail the limits of Atlantic Forest (Af), Cerrado (Ce) and Pantanal (Pa) in the state of Mato Grosso do Sul. Red delimits the Maracaju Mountains (according to MMA, 2007). For the localities number see Appendix 1.

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