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Inventarios de especies

List of medium- and large-sized mammal species from an Atlantic Forest fragment in Brazil

Regiane Linhares Silva[1]*, Claudia Guimarães Costa[2], Carlos Leonardo Vieira[3]

1 Universidade Federal da Integração Latino-Americana, Loteamento Universitário das Américas - Foz do Iguaçu, PR - Brasil.
2 Museu de Ciências Naturais PUC Minas, Pós-graduação em Zoologia UFMG, Belo Horizonte, MG, Brasil.
3 FL8 Meio Ambiente Ltda., Belo Horizonte, MG, Brasil.
* **Correspondencia:** regianelinharessilva@gmail.com

Resumen

La Mata Atlántica es uno de los principales reservorios de biodiversidad de mamíferos a escala global, siendo reconocida como un *hotspot* mundial de la biodiversidad. A pesar de los esfuerzos realizados en el bioma durante las últimas décadas, aún hay áreas poco estudiadas. Por esta razón, con el objetivo de ampliar el conocimiento sobre la mastofauna de mediano y gran tamaño en el distrito de São Bento de Urânia, Alfredo Chaves, en el estado de Espírito Santo, Brasil, se realizó un inventario. Se registraron 15 especies de mamíferos silvestres, de las cuales dos están en peligro de extinción, el *Herpailurus yagouaroundi* (Jaguarundi), catalogado como Vulnerable en la lista de especies amenazadas de Brasil, y el *Leopardus guttulus* (Southern Tiger Cat), clasificado como Vulnerable tanto en la lista brasileña como en la UICN, y en Peligro de Extinción según la lista estatal de especies amenazadas de Espírito Santo. Además, se pudo verificar que las especies más recurrentes (*i.e.*, con el mayor Índice de abundancia relativa) del estudio fueron aquellas que tienden a ser menos sensibles en el uso del hábitat y que se encontraron en la mayoría de los ambientes monitoreados. El presente estudio, además de presentar una lista de especies, resalta la importancia de los remanentes de bosque tropical de la Mata Atlántica.

Palabras clave: Índice de Abundância Relativo, Inventário, Mamíferos, Mata Atlântica, São Bento de Urânia.

Abstract

The Atlantic Forest is one of the main global reservoirs of mammalian biodiversity and is recognized as a worldwide biodiversity hotspot. Despite the efforts undertaken in the biome over recent decades, there are still poorly studied areas. For this reason, aiming to expand knowledge of medium- and large-sized mammal fauna in the district of São Bento de Urânia, Alfredo Chaves, in the state of Espírito Santo, Brazil, an inventory was conducted. We reported 15 wild mammal species, of which two are threatened: *Herpailurus yagouaroundi* (jaguarundi) is listed as Vulnerable on the Brazilian list of threatened species, and *Leopardus guttulus* (southern tiger cat), classified as Vulnerable on both the Brazilian list and the IUCN, and is listed as Endangered according to the list of threatened species of Espírito Santo. In addition, it was found that the most recurrent species (*i.e.,* with the highest relative abundance index) in the study were those that tend to be less sensitive in their use of habitat and were found in most of the monitored environments. This study, in addition to presenting a species list, highlights the importance of the remnants of tropical forest within the Atlantic Forest.

Key words: Relative Abundance Index, Inventory, Mammals, Atlantic Forest, São Bento de Urânia.

Currently, 778 species of wild mammals are described for Brazil, representing approximately 11.8% of the world's existing mammal diversity (Abreu et al. 2024; Mammal Diversity Database 2024). A portion of 42% of the Brazilian mammals is distributed within the Atlantic Forest (Abreu et al. 2024), one of the world's main biodiversity conservation hotspots (Myers et al. 2000; MMA 2024). According to the SOS Mata Atlântica Foundation and INPE (2024), only 12.4% of the original cover of the Brazilian Atlantic Forest remains, represented by fragments unevenly distributed across the landscape. Specifically, for Espirito Santo, although the Atlantic Forest originally covered almost the entire state (FUNDAÇÃO SOS MATA ATLÂNTICA & INPE 2024), and despite deforestation being reduced between 2022 and 2023, the Atlantic Forest currently covers only 10.5% of the state's boundaries, with high fragmentation and low connectivity. It is estimated that the Atlantic Forest in the state of Espírito Santo harbours around 180 species, 41 of which are threatened (Costa et al. 2019).

Despite a reduction in deforestation rates within the state, forest remnants remain under anthropogenic pressure. Several factors are known to contribute to species vulnerability and their threat categories, including wildfires, habitat reduction, hunting, introduction of exotic and invasive species, among others (Thomaz 2010; Tebaldi et al. 2013; Srbek-Araujo & Kierulff 2016; Sarmento-Soares & Martins-Pinheiro 2017). In addition to these challenges, there are knowledge gaps regarding the occurrence and distribution of mammals in Espírito Santo (Moreira et al. 2008; Graciano et al. 2020), which are even more evident in areas distant from major research centers or Conservation Units (CUs) (Madeira et al. 2008; Moreira et al. 2008). In this context, wildlife inventories contribute to expanding scientific knowledge, thereby supporting further research and improving the accuracy of threatened species lists (Silveira et al. 2010).

From the above perspective, the present study aims to provide a species list obtained through camera trapping in a natural vegetation area of approximately 25 hectares at Sítio Terras Claras (-20,4739, -40,8839, Datum: WGS84), a private land located in the district of São Bento de Urânia, municipality of Alfredo Chaves, Espírito Santo, Brazil (Figure 1). The climate of this region is classified as humid subtropical with an average temperature of 22.0°C and an annual precipitation of 1.652 mm (Alvares et al. 2014; ClimaData 2024). The site is part of the Southeast Atlantic hydrographic region, with the main water sources being the Córrego Caeté and the Benevente River (Infosanbas 2024). It is situated within the Atlantic Forest biome, in a mosaic of native vegetation consisting of dense ombrophilous forest and semi-deciduous seasonal forest, with an altitude ranging from 895 to 1.020 masl.

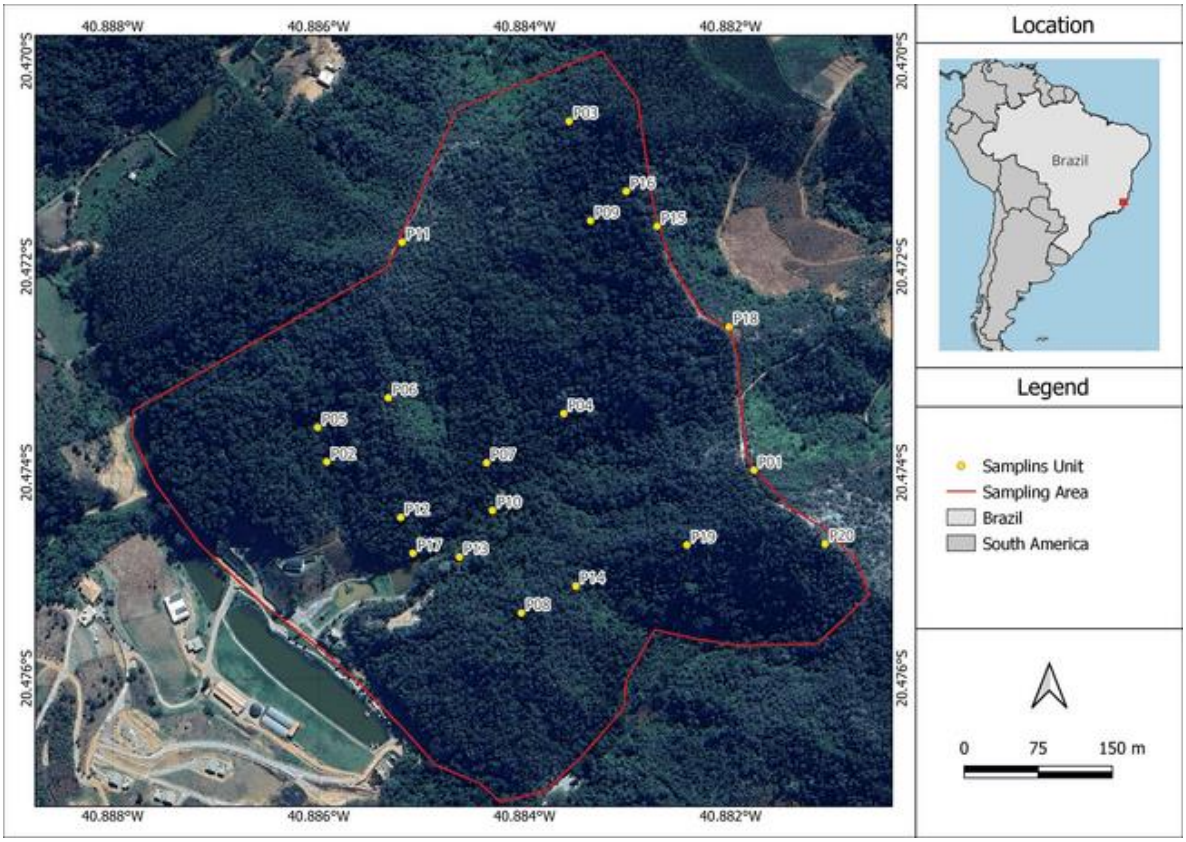

Figure 1. Study area indicating the camera trap installations at Sítio Terras Claras, located in the district of São Bento de Urânia, Alfredo Chaves-Espírito Santo, Brazil.

The sampling of medium and large mammals consisted of recording species through photographs and videos captured by a motion-sensor camera (Srbek-Araujo & Chiarello 2007). A 20 MP HC 801a model camera trap was deployed and remained active for 15 days at each of the 20 sampling points, with a minimum distance between camera stations of 200 m. They were active between October 2023 and September 2024. The camera was configured to record 40 s videos and a three-second interval between triggers. The total sampling effort amounted to 300 trap/nights. Camera traps were not baited to avoid overestimating individual frequency per habitat and to prevent attracting species that do not naturally occur in the sampled areas. The selection and distribution of sampling units was conducted ad hoc, where sampling sites were chosen to meet the criteria of representativeness across vegetation types and altitudinal gradients, independence among sampling units, and suitability for mammal occurrence. Thus, eight sampling units were placed in forested vegetation areas, eight in higher-altitude areas with sparser tree presence, and four sampling units in forest edge areas.

New records were considered only for individuals displaying distinguishing characteristics (*e.g.,* natural markings, spot patterns, or deformities) or for detections occurring at intervals greater than 24 hours. The taxonomic arrangement followed Abreu et al. (2024). Additionally, to assess space use by the recorded mammals, we calculated the relative abundance index (RAI), based on the number of records obtained through the camera traps and sampling effort.

We recorded a total of 15 species of medium and large mammals, belonging to 11 families across five taxonomic orders, only one endangered in the state (Espírito Santo 2022). Despite being a rapid inventory with limited spatial and temporal coverage, conducted in a forest fragment outside protected areas, the number of species recorded is consistent with the sampling effort employed, yielding satisfactory results when compared to other studies conducted in Brazilian Atlantic Forest areas. (Farreguetti & Rocha 2014; Calaça et al. 2018; Sánchez-Lalinde et al. 2019; Seabra et al. 2025). The six species with the highest RAI, in descending order, were: *Cerdocyon thous* (Crab-eating fox), *Cuniculus paca* (Paca), *Leopardus guttulus* (Southern Tiger Cat), *Didelphis aurita* (Brazilian Common Opossum), *Subulo gouazoubira* (Gray Brocket), and *Dasypus novemcinctus* (Nine-banded Armadillo) and *Philander quica* (Cuica) (Table 1; Figure 2).

TABLE 1. List of recorded mammal species, Relative Abundance Index (RAI), registration point, and conservation status, indicating species threatened with extinction at the state, national, and global levels. a: MMA, 2022; b: IUCN, 2024, c: Espírito Santo, 2022.

Family	Species	RAI	Conservation Status
Cervidae	*Subulo gouazoubira* (Fischer, 1814)	2,67	
Canidae	*Cerdocyon thous* (Linnaeus, 1766)	20,00	
Felidae	*Herpailurus yagouaroundi* (É. Geoffroy Saint-Hilaire, 1803)	0,67	Vulnerable[a] Vulnerable[b]
	Leopardus guttulus (Hensel, 1872)	6,33	Vulnerable[a] Endangered[c]
	Leopardus pardalis (Linnaeus, 1758)	0,67	
Mustelidae	*Eira barbara* (Linnaeus, 1758)	0,33	
Procyonidae	*Procyon cancrivorus* Cuvier, 1798	1,00	
Chlamyphoridae	*Euphractus sexcinctus* (Linnaeus, 1758)	0,67	
	Cabassous tatouay (Desmarest, 1804)	0,33	
Dasypodidae	*Dasypus (Dasypus) novemcinctus* Linnaeus, 1758	2,00	
Didelphidae	*Didelphis aurita* (Wied-Neuwied, 1826)	5,33	
	Philander quica (Temminck, 1824)	2,00	
Cuniculidae	*Cuniculus paca* (Linnaeus, 1766)	9,00	
Erethizontidae	*Coendou (Sphiggurus) insidiosus* (Olfers, 1818)	0,67	
Sciuridae	*Guerlinguetus brasiliensis* (Gmelin, 1788)	1,33	

The species *C. thous* and *C. paca* recorded the highest RAI values, as they were detected at most sampling points. *C. thous* is a habitat generalist that benefits from anthropogenic environments (Santos et al. 2024). In contrast, *C. paca*, although less tolerant of anthropogenic environments, can exploit marginal habitats within human-modified landscapes (Gutierrez et al. 2017). *L. guttulus*, classified as endangered (Espírito Santo 2022), which had the third-highest RAI among the 15 species recorded, was the most

frequent mammal in higher-altitude areas with the presence of natural fields. This result supports studies by Linck et al. (2021) and Krobel (2022), which suggest that the species tends to avoid anthropogenic environments and shows a greater preference for high-altitude habitats and natural fields. Furthermore, some individuals of *L. guttulus* were recorded on different days and locations within the study area, indicating the presence and use of the area by more than one individual.

The inventory recorded two species of conservation concern, such as *Herpailurus yagouaroundi*, considered vulnerable (VU) according to the national list of threatened species (MMA 2022), and *L. guttulus*, which is listed as vulnerable (VU) in both the national and global threatened species lists (De Oliveira et al. 2016; MMA 2022; IUCN 2024), and endangered (EN) on the Espírito Santo list (Espírito Santo 2022). Mesocarnivores, such as the felines of the genus *Leopardus*, *H. yagouaroundi*, and *Eira barbara*, rely on large home ranges for population maintenance and, therefore, serve as potential bioindicators of high environmental quality (Marques & Mazim 2005; Dias & Bocchiglieri 2016).

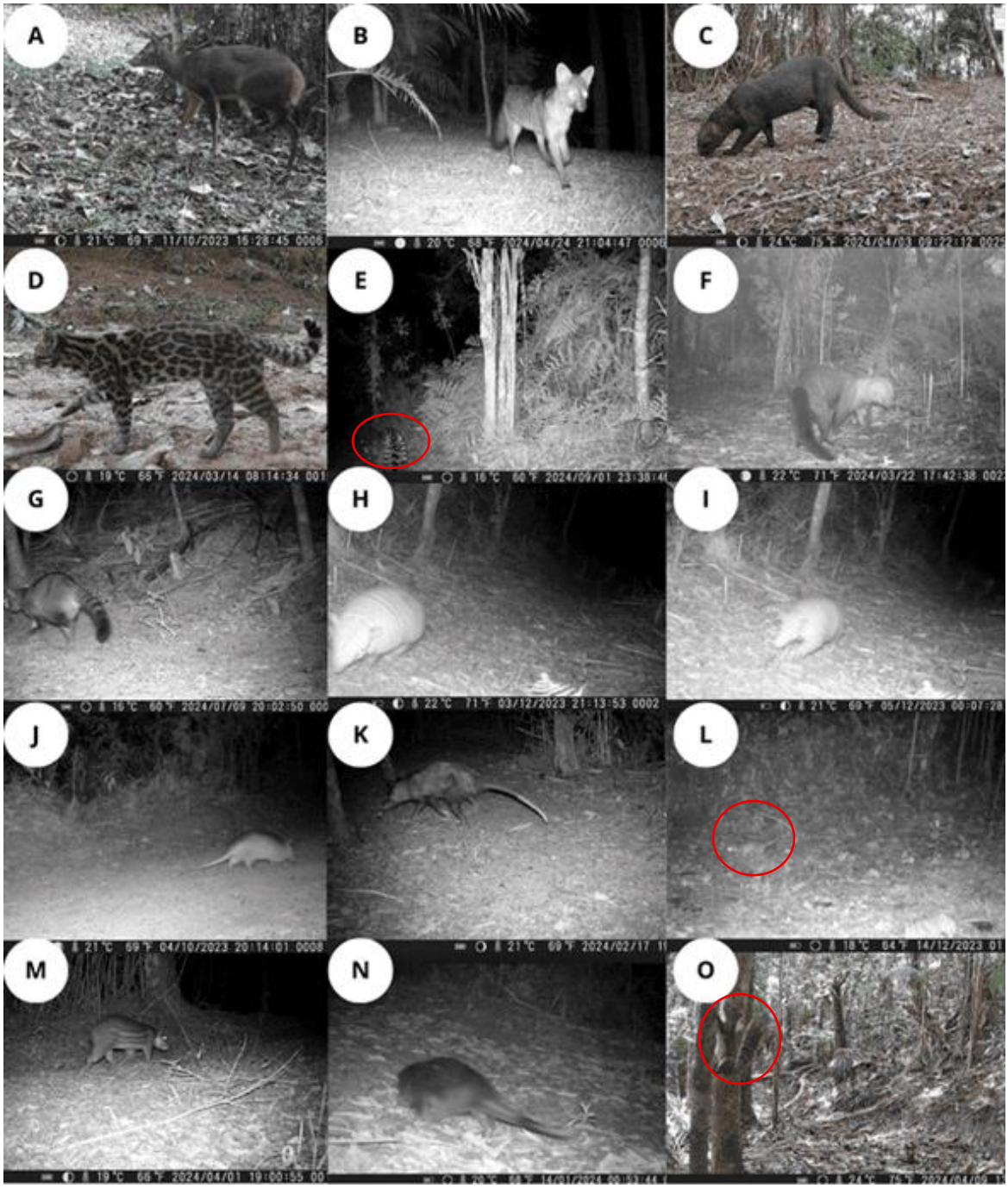

Figure 2. *Subulo gouazoubira* (A) *Cerdocyon thous* (B), *Herpailurus yagouaroundi* (C), *Leopardus guttulus* (D), *Leopardus pardalis* (E), *Eira barbara* (F), *Procyon cancrivorus* (G), *Euphractus sexcinctus* (H), *Cabassous tatouay* (I), *Dasypus novemcinctus* (J), *Didelphis aurita* (K), *Philander quica* (L), *Cuniculus paca* (M), *Coendou insidiosus* (N) and *Guerlinguetus brasiliensis* (O).

Although Sítio Terras Claras contains is immersed in an anthropogenic matrix. Our inventory revealed a relevant community of wild mammals, including species typical of forest environments, mesocarnivores, and endangered species. Moreover, the frequent occurrence of small felids and game species (*C. paca, Subulo gouazouriba,* armadillos,

among others) highlights the need for studies addressing aspects of population dynamics of these species in altered landscapes. Additionally, because the sampling points were not surveyed concomitantly throughout the sampling period, we did not explore the data for spatiotemporal assessment of the recorded specimens. In this regard, we suggest that future studies in this region consider seasonal variation in mammal presence across the sampled areas.

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