



## Checklist of mammals from Goiás, central Brazil

Wellington Hannibal<sup>1\*</sup>, Marlon Zortéa<sup>2</sup>, Analice M. Calaça<sup>2</sup>, Ana Paula Carmignotto<sup>3</sup>, Alexandra M. R. Bezerra<sup>4</sup>, Henrique G. Carvalho<sup>5</sup>, Cibele R. Bonvicino<sup>6</sup>, Ana C. M. Martins<sup>7</sup>, Ludmilla M. S. Aguiar<sup>8</sup>, Marcelino B. de Souza<sup>9</sup>, Ingrid de Mattos<sup>10</sup>, Roniel F. Oliveira<sup>1</sup>, Daniel Brito<sup>11</sup>, Diego A. Silva<sup>2</sup>, Marco A. Guimarães<sup>12</sup>, Edwilson M. B. do Carmo<sup>13</sup> & Jânio C. Moreira<sup>12</sup>

<sup>1</sup>Universidade Estadual de Goiás, Laboratório de Ecologia e Biogeografia de Mamíferos, Quirinópolis, GO, Brasil.

<sup>2</sup>Universidade Federal de Jataí, Laboratório de Biodiversidade Animal, Jataí, GO, Brasil.

<sup>3</sup>Universidade Federal de São Carlos, Departamento de Biologia, Laboratório de Diversidade Animal, Campus Sorocaba, Sorocaba, SP, Brasil.

<sup>4</sup>Museu Paraense Emílio Goeldi, Coordenação de Zoologia, Mastozoologia, Belém, PA, Brasil.

<sup>5</sup>Universidade Federal de Goiás, Programa de Pós-Graduação em Biodiversidade Animal, Goiânia, GO, Brasil.

<sup>6</sup>INCA, Divisão de Genética, Rio de Janeiro, RJ, Brasil.

<sup>7</sup>Instituto Chico Mendes de Conservação da Biodiversidade, Coordenação de Identificação e Planejamento de Ações para Conservação – COPAN, Brasília, DF, Brasil.

<sup>8</sup>Universidade de Brasília, Departamento de Zoologia, Campus Darcy Ribeiro, Brasília, DF, Brasil.

<sup>9</sup>Universidade Federal de Goiás, Instituto de Ciências Biológicas, Laboratório de Mutagênese, Goiânia, GO, Brasil.

<sup>10</sup>Universidade de Brasília, Programa de Pós-Graduação em Zoologia, Campus Darcy Ribeiro, Asa Norte, Brasília, DF, Brasil.

<sup>11</sup>Universidade Federal de Goiás, Departamento de Ecologia, Laboratório de Ecologia Aplicada e Conservação, GO, Brasil.

<sup>12</sup>Instituto Federal Goiano, Laboratório de Ecologia, Evolução e Sistemática de Vertebrados, Rio Verde, GO, Brasil.

<sup>13</sup>Universidade Federal de Catalão, Catalão, GO, Brasil.

\*Corresponding author: [wellingtonhannibal@gmail.com](mailto:wellingtonhannibal@gmail.com)

HANNIBAL, W., ZORTÉA, M., CALAÇA, A.M., CARMIGNOTTO, A.P., BEZERRA, A.M.R., CARVALHO, H.G., BONVICINO, C.R., MARTINS, A.C.M., AGUIAR, L.M.S., DE SOUZA, M.B., MATTOS, I., OLIVEIRA, R.F., BRITO, D., SILVA, D.A., GUIMARÃES, M.A., DO CARMO, E.M.B., MOREIRA, J.C. **Checklist of mammals from Goiás, central Brazil.** *Biota Neotropica* 21(3): e20201173.

<https://doi.org/10.1590/1676-0611-BN-2020-1173>

**Abstract:** The state of Goiás, in central Brazil, is covered mainly by the Cerrado domain, with the Alto Paraná Atlantic Forest occupying its central-southern portion. Goiás is one of the 20 Brazilian federative units without a mammal checklist. In this study, we provide the first checklist of mammals from Goiás state. We recorded mammal species based primarily on the analysis of specimens housed in scientific collections as well as on literature with associated voucher material. We listed 191 mammalian species belonging to 125 genera, 31 families and 10 orders, which represents 25.2% of the mammal species occurring in Brazil. The most speciose orders were Chiroptera (90 spp.), followed by Rodentia (43 spp.), Carnivora (19 spp.) and Didelphimorphia (17 spp.). The following orders accounted for a smaller portion of the state diversity: Cetartiodactyla (7 spp.), Cingulata (7 spp.), Primates (4 spp.), Pilosa (2 spp.), Lagomorpha (1 sp.), and Perissodactyla (1 sp.). A total of 28 species (14.7%), mainly represented by medium and large-sized mammals, are nationally threatened while 12 (6.3%) are globally threatened. Our results indicate great portions of the state lacking a proper survey of mammals, especially the northwestern portion. We discuss species richness, distribution and conservation status of the mammals of Goiás state in national and regional scenarios. We highlight the need for mammal inventories based on complementary survey techniques with the collection of vouchers in order to provide karyologic, molecular, morphologic, parasitologic, and ecological data. These informations are the basis for integrative studies that lead to the understanding of current mammalian richness and diversity. Indeed, knowledge on species richness distribution in the state will guide conservation strategies, especially in areas undergoing habitat loss and fragmentation, such as the central-southern portion of Goiás.

**Keywords:** Atlantic Forest; Bats; Cerrado; Inventory; Large mammals; Small non-volant mammals.

## Lista de Mamíferos de Goiás, Brasil central

**Resumo:** O estado de Goiás, no Brasil central, é coberto principalmente pelo domínio do Cerrado, com a Mata Atlântica do Alto Paraná ocupando sua porção centro-sul. Goiás é uma das 20 unidades federativas brasileiras que ainda não possui uma lista de espécies de mamíferos. Neste estudo, apresentamos a primeira lista de mamíferos para o estado. Registramos as espécies de mamíferos com base principalmente na análise de espécimes depositados em coleções científicas, bem como na literatura apresentando material testemunho associado. Listamos 191 espécies pertencentes a 125 gêneros, 31 famílias e 10 ordens, as quais representam 25,2% das espécies de mamíferos que ocorrem no Brasil. As ordens mais especiosas foram Chiroptera (90 spp.), seguida pelas ordens Rodentia (43 spp.), Carnivora (19 spp.) e Didelphimorphia (17 spp.), com as demais ordens respondendo por uma porção menor da diversidade: Cetartiodactyla (7 spp.), Cingulata (7 spp.), Primates (4 spp.), Pilosa (2 spp.), Lagomorpha (1 sp.) e Perissodactyla (1 sp.). Um total de 28 espécies (14,7%), principalmente representadas por mamíferos de médio e grande porte, estão ameaçadas nacionalmente e 12 (6,3%) encontram-se globalmente ameaçadas. Nossos resultados indicaram grandes porções do estado ainda não devidamente pesquisadas em relação aos seus mamíferos, com informações escassas e fragmentadas, principalmente no que diz respeito à sua porção noroeste. Discutimos a riqueza de espécies, a distribuição e o estado de conservação dos mamíferos do estado de Goiás nos cenários nacional e regional. Ressaltamos a importância da realização de inventários que utilizem técnicas complementares de amostragem, incluindo a coleta de material testemunho, proporcionando a obtenção de dados cariotípicos, moleculares, morfológicos, parasitológicos e ecológicos. Estas informações são a base de estudos integrativos, os quais aumentam nossa compreensão a respeito da riqueza e diversidade atual dos mamíferos. O conhecimento a respeito da distribuição da riqueza de espécies em Goiás é essencial para embasar estratégias de conservação, tão necessárias em áreas que vem sofrendo com a perda e fragmentação de seus habitats naturais, como a porção centro-sul do estado.

**Palavras-chave:** Cerrado; Inventário; Mamíferos de médio e grande porte; Mata Atlântica; Morcegos; Pequenos mamíferos não voadores.

## Introduction

The number of mammalian species has increased through time; currently, more than 6,400 species are recognized worldwide, with the Neotropics considered as the third most species-dense biogeographic region (Burgin et al. 2018; 2019). Within this region, Brazil is the richest country, which might be related to its large area and environmental heterogeneity (Quintela et al. 2020). This diverse country holds 759 native species, distributed in 249 genera, 51 families and 11 orders (Abreu et al. 2020; Quintela et al. 2020).

Although there is an enormous potential to describe new species [e.g., many have been recently surveyed, while many groups need taxonomic reviews (Gonçalves & Oliveira 2014; Nascimento & Feijó 2017; Bezerra et al. 2020)] and a great field for research on their ecology, biogeography, and population genetics, among others, we are facing an unfavorable scenario for conservation biology in the country (Quintela et al. 2020). The Cerrado and Atlantic Forest domains harbor a high mammalian diversity and endemism (Paglia et al. 2012; Gutiérrez & Marinho-Filho 2017; Quintela et al. 2020), and have been severely threatened by anthropogenic impacts, moreover were listed, among only 34 other regions, as biodiversity hotspots for the world conservation (Myers et al. 2000; Mittermeier et al. 2004). More than 80% of the remnants of the Brazilian Atlantic Forest are smaller than 50 ha (Ribeiro et al. 2009), and for the Cerrado, more than 50% of its original area (approximately 2 million km<sup>2</sup>) have been converted into pasture and agricultural areas (Klink & Machado 2005; Strassburg et al. 2017).

Considering the large Brazilian territory, its environmental heterogeneity and conservation status, currently only seven federative units have checklists of mammals available: Amapá (Silva et al. 2013), Espírito Santo (Moreira et al. 2008), Mato Grosso (Brandão et al.

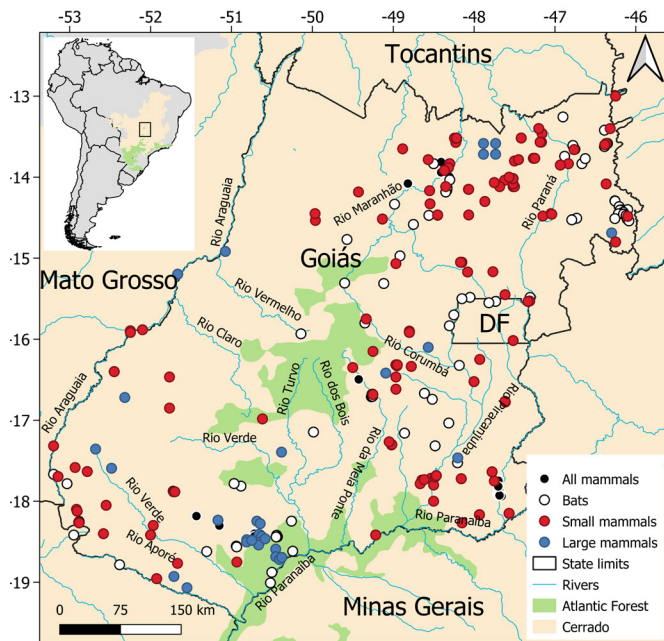
2019), Mato Grosso do Sul (Cáceres et al. 2008; Tomas et al. 2017), Santa Catarina (Cherem et al. 2004), São Paulo (Vivo 1998; Vivo et al. 2011), and Rio de Janeiro (Rocha et al. 2004). A checklist is the first step in order to plan inventories, conduct biogeographic and systematic studies, and develop conservation actions; thus, a review of the mammal records for each Brazilian state is warranted (Brandão et al. 2019). In this study, we provide the first checklist of mammals from Goiás state, with comments on their distribution and conservation.

## Material and Methods

### 1. Study site

The state of Goiás is located in central Brazil (12° to 19° S, 46° to 53° W) and is represented by two ecoregions: Cerrado and Alto Paraná Atlantic Forest (Dinerstein et al. 2017) (Figure 1). Goiás has the seventh largest territorial extension among the 27 federative units in the country, with approximately 340,106 km<sup>2</sup> (IMB 2020), representing 4% of the national territory. It is almost entirely characterized by the Cerrado domain, with its remnants being severely fragmented mainly by cattle ranching and agriculture activities (Prado et al. 2012), as well as other threats such as hydroelectric dams and mining (Melo & Soares 2005).

The Brazilian savanna is composed of a continuous mosaic represented by different phytophysiognomies ranging from grasslands to closed canopy forests (Eiten 1972). However, the distribution of these phytophysiognomies throughout the domain is not equitable (e.g., while gallery forests represent only 5% of the total area of the Cerrado, the *stricto sensu* cerrados cover about 70% of the landscape) (Ribeiro et al. 1998; Oliveira et al. 2017). The Cerrado in Goiás also ranges through a great elevational gradient, from valleys and depressions



**Figure 1.** Map of Goiás state in central Brazil. Sampling points for mammalian species according to records listed in Table 1 (see Supplementary Material S1 for access to the references and coordinates). Ecoregions and rivers (adapted from Dinerstein et al. 2017). Black lines indicate the political geographic boundaries.

mainly located at its western portion at the Araguaia river margins, to highlands located at the Brazilian Central Plateau in its central and eastern portions (Cardoso & Marcuzzo 2014). The Chapada dos Veadeiros and Serra Geral do Paranã, at its northeastern border, are the most elevated regions, ranging from 800 to 1,700 meters high (NASA 2002). Three main hydrographic basins delimit and cross the Cerrado in Goiás: the Araguaia at west, Tocantins at central, and São Francisco at its eastern border. The other ecoregion, the Alto Paraná Atlantic Forest, is represented by forest patches in its central-southern portion (Figure 1), mainly located at river margins and valleys of the Paraná hydrographic basin, also at the Brazilian Central Plateau slopes (RADAMBRASIL 1982). Goiás climate is classified as Köppen's Aw – tropical with dry winters (Setzer 1966). The mean annual temperature is around 23°C, and the mean annual pluviosity around 1,500 mm. However, the temperature and rainfall regime define two distinct seasons: the hot and wet season during the months of October to April, with temperatures around 26–27°C, concentrating 85% of the rainfall; and the cold and dry season, ranging from May to September, with a total pluviosity around 200 mm, and mean temperatures around 21°C (Cardoso & Marcuzzo 2014).

These environmental features, together with the climatic fluctuations during the Tertiary and Quaternary periods, have shaped the biogeography and evolutionary history of the Cerrado, leading to the great biodiversity and endemism currently found, with the neighboring forested domains playing a major role (Da Silva & Bates 2002; Werneck 2011).

## 2. Data collection

We recorded mammal species based primarily on the analysis of specimens housed in mammalian scientific collections: American Museum of Natural History, New York, USA (AMNH); Laboratório de Biodiversidade Animal, Universidade Federal de Jataí, Goiás, Brazil (CJ); Laboratório de Biologia e Parasitologia de Mamíferos Silvestres Reservatórios, Instituto

Oswaldo Cruz, Fiocruz, Rio de Janeiro, Brazil (LBCE); Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (MN); Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (MZUSP); Universidade de Brasília, Brasília, Brazil (UnB, CMVUNB [Coleção de Mamíferos Voadores da Universidade de Brasília]); Universidade Federal de Minas Gerais, Belo Horizonte, Brazil (UFMG); Universidade Federal da Paraíba, João Pessoa, Brazil (UFPB). We tried to include at least one voucher per species to attest the presence of each taxon in the state (see Table 1).

We also searched for articles about mammals from Goiás in the following databases: Scientific Electronic Library Online (SciELO, [www.scielo.org](http://www.scielo.org)), Web of Science (WoS, <http://portal.isiknowledge.com>), Scopus® ([www.scopus.com](http://www.scopus.com)) and Periódicos CAPES (<http://www.periodicos.capes.gov.br/>). The combination of the keywords “Goiás AND mammals”, “Cerrado AND mammals”, “savanna AND mammals” were used. We also used the database of the Brazilian Digital Library of Theses and Dissertations of the Brazilian Institute of Sciences and Technology (BDTD 2020). The bibliography with voucher material (records based on photographic evidences – of camera trap, tracks or direct observations – were also considered as vouchers in the case of medium and large-sized mammals) were cited in Table 1 and included as Supplementary Material (S1). The recorded localities were classified by mammal group (bats, small non-flying mammals and medium and large mammals) and plotted in a map (Figure 1) in order to give a general picture of the surveyed areas in Goiás state.

We followed the updated and annotated checklists of mammals from Brazil (Abreu et al. 2020; Quintela et al. 2020) for taxonomic hierarchical categories and nomenclature of the mammal taxa. Since these checklists differ in the treatment of some taxa, we cited our decisions below. We used the name *Cetartiodactyla* Montgelard, Catzeffis & Douzery, 1997 for the order including members of *Artiodactyla* Owen, 1848 and *Cetacea* Brisson, 1762; we used the name *Dicotyles* Cuvier, 1816 for the genus of the collared peccary according to Acosta et al. (2020); both decisions followed Abreu et al. (2020). For the taxonomic nomenclature of Chiroptera we followed Garbino et al. (2020). We considered *Conepatus amazonicus* Hershkovitz, 1994 as a valid taxon; we also treated *Cabassous squamicaudis* (Lund, 1845) as a valid species; both decisions followed Quintela et al. (2020). Here we used the concept of *Marmosa demerarae* (Thomas, 1905) of Silva et al. (2019a) following Quintela et al. (2020). We treated *Calomys mattevii* Gurgel-Filho, Feijó & Langguth 2015 as a junior synonym of *C. expulsus* (Lund, 1840), according to Gutiérrez & Marinho-Filho (2017); *Sybilagus minensis* as a valid species based on Ruedas et al. (2017) and Silva et al. (2019b); and we did not treat *Galea flavidens* as valid, according to Bezerra (2008), differing from the previous checklists. The concept of *Holochilus sciureus* follows the recent study of Prado et al. (2021). Conservation statuses are based on the Brazilian (ICMBio/MMA 2018) and international (IUCN 2020) red lists of threatened species.

## Results and Discussion

A total of 191 mammalian species, distributed in 125 genera, 31 families and 10 orders were recorded for Goiás state. The richest order is Chiroptera, with 90 species, followed by Rodentia (43 spp.), Carnivora (19 spp.), and Didelphimorphia (17 spp.). The other orders comprise less diverse groups: Cetartiodactyla (7 spp.), Cingulata (7 spp.), Primates (4 spp.), Pilosa (2 spp.), Lagomorpha (1 sp.), and Perissodactyla (1 sp.) (Table 1). These results corroborate the richness pattern found in Brazil and in the world, where the most diverse mammals are bats and rodents (Burgin

et al. 2018; Abreu et al., 2020; Quintela et al. 2020), as well as the pattern found in the Cerrado domain, where Chiroptera represents the richest order followed by the Rodentia, Didelphimorphia and Carnivora (Carmignotto et al. 2012). However, bats presented a much higher proportion in the state (47%) compared to the Cerrado (35%), while the opposite trend was found for rodents (22% in Goiás and 34% for the Cerrado), evidencing the lack of studies on this latter group in the state.

A total of 28 species (14.7%) are included in some national threat category (four as endangered – one armadillo, one bat, two rodents - and 24 as vulnerable – one marsupial, one armadillo, one anteater, five bats, one primate, two rodents, nine carnivores, a tapir, two deers, one peccary), while 12 species (6.3%) are globally threatened (three as endangered and nine as vulnerable), 10 (5.2%) are considered as Near Threatened (NT), and 12 (6.3%) as Data Deficient (DD), with this later category mostly represented by rodents and bats (Table 1). The high percentage of threatened and DD species highlight the need to increase our efforts regarding further studies and conservation of target mammalian species and/or poorly surveyed regions in the state.

### 1. *Didelphimorphia*

We recorded 10 genera and 17 species from the family Didelphidae for Goiás state. These taxa include members from two subfamilies: Caluromyinae (2 spp.) and Didelphinae (15 spp.), as well as from three Didelphinae tribes: Marmosini (6 spp.), Didelphini (5 spp.) and Thylamyini (4 spp.). These numbers represent 26% of the 65 Brazilian didelphids (Abreu et al. 2020) and equates richness with other Brazilian states, such as Mato Grosso do Sul (17 spp.– Tomas et al. 2017) and Rio de Janeiro (14 spp. – Rocha et al. 2004).

In relation to general distribution patterns, 53% of these taxa (9 spp.) are widely distributed, and shared between the Cerrado and forested domains, such as the Amazonian and Atlantic Forests. This is the case of *Caluromys lanatus*, *C. philander*, *Chironectes minimus*, *Marmosa murina*, *M. demerarae*, *M. paraguayana*, *Monodelphis americana*, *Philander canus* and *P. quica*. The other half (47% - 8 spp.) is represented by Cerrado endemics (*Thylamys velutinus*) and by taxa shared with other open formations, such as the Caatinga, Pantanal and Chaco, which include *Cryptonanus chacoensis*, *Gracilinanus agilis*, *Didelphis albiventris*, *Lutreolina crassicaudata*, *Monodelphis domestica*, *M. kunsii* and *Thylamys karimii*. These data reveal the composite nature of the didelphid fauna of the state, characterized by inhabitants of forested and open formations, due to the presence of a vegetation mosaic, typical of the Cerrado domain (Carmignotto et al. 2012), and the semideciduous seasonal forest fragments, which still persist in the state (Ribeiro & Walter 2008; IBGE 2011).

Considering the local distribution patterns, we can cite six didelphids that are rare in Goiás, with few records restricted to different portions of the state: *Marmosa paraguayana* and *Philander quica*, both widely distributed in the Atlantic Forest of southeastern Brazil, are restricted to the southeast of Goiás (Carmignotto 2005; Silva et al. 2019a), suggesting a closer relationship between this region and the Atlantic Forest; *Caluromys philander* and *Monodelphis americana*, which occur on both forested domains (Amazon and Atlantic Forest), present few and scattered records in southwestern (only *Caluromys*), central and northern portions of the state (Carmignotto 2005; Cáceres et al. 2008; Pavan et al. 2014); *Lutreolina crassicaudata*, a marsupial with a disjunct distribution in South America, is restricted to its southern

portion (Cáceres et al. 2008; Carmignotto et al. 2014); and *Thylamys velutinus*, a Cerrado endemic species, is restricted to southwestern and northeastern portion of the state, in two protected areas (Parque Nacional das Emas and Parque Nacional da Chapada dos Veadeiros) (Bonvicino et al. 2002, 2005; Carmignotto & Monfort 2006; Carmignotto et al. 2014). Besides the restricted distribution in the state, this latter species is also threatened in Brazil, classified as vulnerable (Rossi et al. 2018). *Thylamys karimii*, although presenting a wider distribution, is also treated as vulnerable at the IUCN Red List (Carmignotto et al. 2016). In the case of *L. crassicaudata*, it is also important to note that the records from Goiás delimit the northeastern range of the southern portion of its distribution in South America (Martínez-Lanfranco et al. 2014).

The richest didelphid communities were found within conservation units, such as the Parque Nacional das Emas (10 spp.– Carmignotto et al. 2014), Parque Nacional da Chapada dos Veadeiros (8 spp.– Bonvicino et al. 2002; 2005), Parque Estadual da Serra de Caldas Novas (6 spp.– Carvalho et al. 2002; Costa et al. 2003; Carmignotto 2005), and areas very well sampled, such as the region of the Hydroelectric dam of Serra da Mesa (11 spp.– Carvalho et al. 2002; Costa et al. 2003; Carmignotto 2019) and the region of Anápolis (7 spp. – Carmignotto 2005). So, the majority of the records were based on few and well sampled localities, ranging from six to 11 didelphids, while the other regions of the state are still poorly sampled (most of them with records of only one species) (Carmignotto 2005).

Indeed, there are some didelphid taxa that need additional taxonomic comments: *Cryptonanus chacoensis* has proven to be a species complex, composed of very similar taxa in morphology, but distinct at molecular levels, with at least three putative species for the state (Carmignotto et al. 2014; Fegies et al. in press). The cited records for the state are all part of *C. chacoensis* complex (see de la Sancha and D'Elia 2014), including those cited as *G. emiliae* by Carvalho et al. (2002) and as *C. agricolai* (Gardner 2008; Gomes et al. 2015). Recent revisionary studies on the genus *Marmosa* subgenus *Micoureus* have also shown genetically and geographically structured populations within *M. demerarae* (Silva et al. 2019a), with populations from central Brazil treated as distinct taxa, such as *M. limae* Thomas, 1920 by Voss et al. (2020) and Abreu et al. (2020), or *M. domina* Thomas, 1920 by Bonvicino et al. (2021). For *Philander*, molecular and morphological studies have also shown that populations from central Brazil can be treated as a distinct taxon: *P. canus*, but the limits of the geographic distribution between this species and *P. quica*, the species from southeastern Brazil, are not delimited yet. Both species are recorded in Goiás, but several records in the state need to be reexamined based on molecular and morphological grounds (Costa 2003; Voss et al. 2018).

### 2. *Cingulata*

We recorded seven species of Cingulata for Goiás state, which represents 58.3% of the species listed for Brazil (Quintela et al. 2020). According to other Brazilian states' checklists, armadillos range from five species in São Paulo (Vivo et al. 2011) and Amapá (Silva et al. 2013), to nine species in Mato Grosso (Brandão et al. 2019). The occurrence of the southern three-banded armadillo *Tolypeutes matacus* was mentioned in an interview for the region of the Parque Nacional das Emas, but only in the past (Rodrigues et al. 2002). Considering that there is no reliable record or voucher material for the species in Goiás, *T. matacus* was not included in the list.

The largest populations of Brazilian three-banded armadillo *Tolypeutes tricinctus* occurs in areas of Bahia on the border with Goiás



**Table 1.** Checklist of mammals from Goiás state, Brazil. Records are based primarily on the analysis of specimens housed in scientific collections (numbers between brackets) and on literature with associated voucher material (numbered citations). Conservation statuses are based on the Brazilian and international red lists of threatened species (ICMBio/MMA 2018 and IUCN 2020, respectively). Acronyms for conservation status categories: DD = data deficient, EN = endangered, NT = near threatened, P/R = pending (re)evaluation, VU = vulnerable. For scientific collections acronyms, please see Material and Methods.

Taxon	Common Name	Record	ICMBio	IUCN
DIDELPHIMORPHIA Gill, 1872				
DIDELPHIDAE Gray, 1821 (17 species)				
<i>Caluromys lanatus</i> (Olfers, 1818)	Brown-eared Woolly Opossum	18, 82, 103 [MN 20963, UnB 2564]		
<i>Caluromys philander</i> (Linnaeus, 1758)	Bare-tailed Woolly Opossum	82, 83 [MZUSP 1160]		
<i>Chironectes minimus</i> (Zimmermann, 1780)	Water Opossum	13, 19, 80, 82, 84 [MN 37815]		
<i>Cryptonanus chacoensis</i> (Tate, 1931)	Chacoan Gracile Opossum	13, 101 [CRB 3067]		
<i>Didelphis albiventris</i> Lund, 1840	White-eared Opossum	3, 13, 18, 19, 79, 80, 82, 98 [MN 43054, MN 46514, UnB 1119]		
<i>Gracilinanus agilis</i> (Burmeister, 1854)	Agile Gracile Opossum	3, 13, 18, 19, 79, 81, 82, 83, 88, 101 [MN 46574, MN 67080, UnB 1198]		
<i>Lutreolina crassicaudata</i> (Desmarest, 1804)	Little Water Opossum	13, 19, 82, 83 [MN 71673, UnB 1927]		
<i>Marmosa demerarae</i> (Thomas, 1905)	Woolly Mouse Opossum	3, 79, 80, 82, 87 [MN 46883, MN 67082]		
<i>Marmosa murina</i> (Linnaeus, 1758)	Linnaeus's Mouse Opossum	13, 19, 82, 83, 102 [UnB 2551]		
<i>Marmosa paraguayana</i> (Tate, 1931)	Tate's Woolly Mouse Opossum	87 [UnB 2987]		
<i>Monodelphis americana</i> (Müller, 1776)	Faint-striped Opossum	3, 82, 85 [MN 46570]		
<i>Monodelphis domestica</i> (Wagner, 1842)	Gray Short-tailed Opossum	3, 13, 18, 79, 80, 82, 85, 90, 100 [MN 67084, MN 46574, MN 46583]		
<i>Monodelphis kunyi</i> Pine, 1975	Pygmy Short-tailed Opossum	13, 18, 80, 82, 85, 90 [MZUSP SAMA 53]		
<i>Philander canus</i> (Osgood, 1913)	Gray Four-eyed Opossum	13, 80, 82, 86, 89 [UnB 1577]	P/R	P/R
<i>Philander quica</i> (Temminck, 1824)	Gray Four-eyed Opossum	82 [UFMG 769]		
<i>Thylamys karimii</i> (Petter, 1968)	Karimi's Fat-tailed Mouse Opossum	4, 80 [MN 36285, MZUSP 32242, UnB 1158]		VU A2c+3c
<i>Thylamys velutinus</i> (Wagner, 1842)	Dwarf Fat-tailed Mouse Opossum	3, 4 [MZUSP 32098, MN 66461]	VU A2c	NT
CINGULATA Illiger, 1811				
CHLAMYPHORIDAE Bonaparte, 1850(5 species)				
<i>Cabassous squamicaudis</i> (Lund, 1845)	Southern Naked-tailed Armadillo	16, 19, 21-23, 25 and 77	P/R	P/R
<i>Cabassous tatouay</i> (Desmarest, 1804)	Greater Naked-Tailed Armadillo	2		DD
<i>Euphractus sexcinctus</i> (Linnaeus, 1758)	Yellow Armadillo	1, 2, 12, 16, 19, 21, 23, 25 and 77 [UnB 1628, UnB 2221, UnB 2235]		
<i>Priodontes maximus</i> (Kerr, 1792)	Giant Armadillo	1, 16, 20, 22, 23 and 25	VU A2cd	VU A2cd
<i>Tolypeutes tricinctus</i> (Linnaeus, 1758) *	Brazilian Three-banded Armadillo	78, [Photo (Supplementary Material S2)]	EN A2cd	VU A2cd
DASYPODIDAE Gray, 1821 (2 species)				

continue...

## continuation...

<i>Dasyus novemcinctus</i> Linnaeus, 1758	Nine-banded Armadillo	1, 2, 11, 12, 19, 21, 22, 23, 25, 77, 115 [UnB 1118, UnB 1602, MZUSP 4130, MN 24460]		
<i>Dasyus septemcinctus</i> Linnaeus, 1758	Brazilian Lesser Long-nosed Armadillo	1, 18, 115 [MN 59336]		
PILOSA Flower, 1883				
MYRMECOPHAGIDAE Gray, 1825 (2 species)				
<i>Myrmecophaga tridactyla</i> Linnaeus, 1758	Giant Anteater	1, 2, 11, 12, 16, 17, 19-25 and 77 [MN 55699, UnB 1603-UnB1607]	VU A2c	VU A2c
<i>Tamandua tetradactyla</i> (Linnaeus, 1758)	Southern Tamandua	1, 2, 11, 12, 16, 17, 19, 21, 22, 23, 25, and 77 [UnB 1238, UnB 2063]		
CHIROPTERA Blumech, 1779				
EMBALLONURIDAE Gervais, 1855 (8 species)				
<i>Centronycteris maximiliani</i> (Fischer, 1829)	Maximilian's Shaggy Bat	42		
<i>Diclidurus ingens</i> Hernández-Camacho, 1955	Greater Ghost Bat	65		
<i>Peropteryx kappleri</i> Peters, 1867	Greater Dog-like Bat	42 and 65		
<i>Peropteryx macrotis</i> (Wagner, 1843)	Lesser Dog-like Bat	34, 41, 42, 51 and 52 [CJ 41, CJ 491, 492]		
<i>Peropteryx trinitatis</i> Miller, 1899	Trinidadian Dog-like Bat	65		
<i>Rhynchonycteris naso</i> (Wied-Neuwied, 1820)	Proboscis Bat	7, 34 and 42 [UnB 431]		
<i>Saccopteryx bilineata</i> (Temminck, 1838)	Greater White-lined Bat	34 and 42		
<i>Saccopteryx leptura</i> (Schreber, 1774)	Brown White-lined Bat	31 and 65 [CJ 53]		
FURIPTERIDAE Gray, 1866 (1 species)				
<i>Furipterus horrens</i> (F. Cuvier, 1828)	Smoky Bat	32, 34, 35, 41 and 42 [CJ 508]	VU A3	
MOLOSSIDAE Gervais, 1856 (14 species)				
<i>Cynomops planirostris</i> (Peters, 1865)	Southern Dog-faced Bat	1, 40, 41 and 57 [CJ 302, CJ 303]		
<i>Eumops glaucinus</i> (Wagner, 1843) *	Wagner's Bonneted Bat	[CJ 01, CJ 43, CJ 67]		
<i>Eumops maurus</i> (Thomas, 1901)	Guianan Bonneted Bat	49		DD
<i>Eumops perotis</i> (Schinz, 1821) *	Greater Bonneted Bat	[UnB 1024]		
<i>Molossops temminckii</i> (Burmeister, 1854)	Dwarf Dog-faced Bat	1, 7, 27, 28, 32, 34, 40, 42, 46, 50, 51, 53, 55-58 and 65 [CMVUNB 1190, 1191, 1193]		
<i>Molossus currentium</i> Thomas, 1901	Corrientes Mastiff Bat	65		
<i>Molossus molossus</i> (Pallas, 1766)	Palla's Mastiff Bat	1, 40, 62, 65 and 67 [CJ 05, CJ 21, CJ 22]		
<i>Molossus rufus</i> É. Geoffroy, 1805	Black Mastiff Bat	65 [CJ 557]		
<i>Neoplatymops mattogrossensis</i> (Vieira, 1842)	Mato Grosso Dog-faced Bat	34, 37 and 42		
<i>Nyctinomops laticaudatus</i> (É. Geoffroy, 1805)*	Geoffroy's Free-tailed Bat	[UnB 791]		
<i>Nyctinomops macrotis</i> (Gray, 1840)	Big Free-tailed Bat	34 and 42		
<i>Promops centralis</i> Thomas, 1915	Crested Mastiff Bat	65		
<i>Promops nasutus</i> (Spix, 1823)	Brown Mastiff Bat	65		
<i>Tadarida brasiliensis</i> (I. Geoffroy, 1824)	Brazilian Free-tailed Bat	51 and 65		
MORMOOPIDAE Saussure, 1860 (3 species)				
<i>Pteronotus gymnonotus</i> (Wagner, 1843)	Big Naked-backed Bat	1, 40, 41, 59 and 65 [CJ 14]		
<i>Pteronotus personatus</i> (Wagner, 1843)	Wagner's Mustached Bat	7 [CJ 630]		

continue...

## Mammals of Goiás, Brazil

## continuation...

<i>Pteronotus rubiginosus</i> (Wagner, 1843)	Ferruginous Mustached Bat	1, 7, 33-35, 40-42, 46, 50, 51, 56 and 65		
NATALIDAE Gray, 1866 (1 species)				
<i>Natalus macrourus</i> (Gervais, 1856)	Brazilian Funnel-eared Bat	34, 38, 41, 42 and 52	VU A3c	NT
NOCTILIONIDAE Gray, 1821 (2 species)				
<i>Noctilio albiventris</i> Desmarest, 1818	Lesser Bulldog Bat	7		
<i>Noctilio leporinus</i> (Linnaeus, 1758)	Greater Bulldog Bat	27, 28, 31 and 55 [CMVUNB 1198-CMVUNB 1203]		
PHYLLOSTOMIDAE Gray, 1825 (49 species)				
<i>Carollia brevicauda</i> (Schinz, 1821)	Silky Short-tailed Bat	43 [UnB 1557]		
<i>Carollia perspicillata</i> (Linnaeus, 1758)	Seba's Short-tailed Bat	1, 7, 18, 27, 31, 32, 34, 35, 40-42, 46, 47, 50-53, 55-59, 60, 62 and 66 [CMVUNB 1153-CMVUNB 1157]		
<i>Desmodus rotundus</i> (É. Geoffroy, 1810)	Common Vampire Bat	1, 7, 18, 32, 33-35, 41, 42, 46, 50-53, 55-59, 60, 62 and 66 [CMVUNB 1262-1264]		
<i>Diaemus youngi</i> (Jentink, 1893)	White-winged Vampire Bat	69		
<i>Diphylla ecaudata</i> Spix, 1823	Hairy-legged Vampire Bat	32, 35, 41, 46, 50, 55 and 59 [CJ 503, CMVUNB 1277]		
<i>Anoura caudifer</i> (É. Geoffroy, 1818)	Lesser Tailless Bat	7, 18, 32, 35, 39-41, 51, 55, 57, 58, 62 and 66 [CMVUNB 1145, CMVUNB 1159]		
<i>Anoura geoffroyi</i> Gray, 1838	Geoffroy's Tailless Bat	1, 7, 34, 39, 40-42, 46, 50, 51, 53, 56-58 [CJ 50, CJ 204, CJ 210]		
<i>Choeroniscus minor</i> (Peters, 1868)	Lesser Long-tailed Bat	41		
<i>Glossophaga soricina</i> (Pallas, 1766)	Pallas's Long-tongued Bat	1, 7, 18, 28, 31, 32, 34, 35, 39-42, 46, 50-53, 55-58, 61, 62, 66 and 67 [CMVUNB 1249, CMVUNB 1252]		
<i>Glyphonycteris behnii</i> (Peters, 1865)	Behn's Big-eared Bat	51	VU A4c	DD
<i>Hsunnycteris thomasi</i> (J. A. Allen, 1904) *	Thomas's nectar bat	[UnB 1567]		
<i>Lionycteris spurrelli</i> Thomas, 1913	Chestnut Long-tongued Bat	7, 32, 34, 42 and 66 [CJ 556]		
<i>Lonchophylla bokermanni</i> Sazima, Vizotto & Taddei, 1978	Bokermann's Nectar Bat	42		EN B1ab (iii)
<i>Lonchophylla dekeyseri</i> Taddei, Vizotto & Sazima, 1983	Dekeyser's Nectar Bat	1, 7, 35, 40, 41, 56, 50, 52, 53, 55, 63 and 66 [CMVUNB 1290, CMVUNB 1291]	EN C2a (iiLon)	EN C2a (i)
<i>Lonchophylla mordax</i> Thomas, 1903	Goldman's Nectar Bat	42		NT
<i>Xeronycteris vieirai</i> Gregorin & Ditchfield, 2005	Vieira's Long-tongued Bat	68	VU A4c	DD
<i>Lonchorhina aurita</i> Tomes, 1863	Tome's Sword-nosed Bat	7, 32, 34, 35, 41, 42, 52, 56, 59 and 66 [CJ 502]	VU A3c	
<i>Micronycteris megalotis</i> (Gray, 1842)	Little Big-eared Bat	32, 34, 35, 41, 42, 52, 57 and 59 [CJ 49, CJ 55, CJ 232]		

continue...

## continuation...

<i>Miconycteris minuta</i> (Gervais, 1856)	White-bellied Big-eared Bat	1, 40, 41, 46, 50, 51, 53 and 55 [CJ 48, CMVUNB 1251, CMVUNB 1261]
<i>Chrotopterus auritus</i> (Peters, 1856)	Woolly False Vampire Bat	1, 32, 40, 41, 51, 52, 55, 56, 58 and 60 [CJ 27, CMVUNB 1266]
<i>Gardnerycteris crenulatum</i> (É. Geoffroy, 1810)	Striped Hairy-nosed Bat	7, 34, 42, 51, 57 and 58 [CJ 215, CJ 261]
<i>Lophostoma brasiliense</i> Peters, 1866	Pygmy Round-eared Bat	7, 42, 46, 50, 51, 58 and 60 [CJ 208]
<i>Lophostoma carrikeri</i> (J. A. Allen, 1910)	Carriker's Round-eared Bat	54
<i>Lophostoma silvicola</i> d'Orbigny, 1836	White-throated Round-eared Bat	7, 34, 42 and 51 [CJ 900, UnB 647]
<i>Macrophyllum macrophyllum</i> (Schinz, 1821)	Long-legged Bat	32, 34 and 42 [CJ 547]
<i>Mimon bennettii</i> (Gray, 1838)	Southern Golden Bat	18, 34, 35, 41, 42, 46, 48, 50-53, 55, 57 and 58 [CMVUNB 1161, UnB 1420]
<i>Phylloderma stenops</i> (Peters, 1865)	Pale-faced Bat	41
<i>Phyllostomus discolor</i> (Wagner, 1843)	Pale Spear-nosed Bat	1, 7, 34, 40, 42, 46, 50, 51, 57, 58, 62 and 62 [CJ 301, 304, 305]
<i>Phyllostomus elongatus</i> (É. Geoffroy, 1810)	Lesser Spear-nosed Bat	7 [CJ 549]
<i>Phyllostomus hastatus</i> (Pallas, 1767)	Greater Spear-nosed Bat	7, 18, 27, 28, 31, 34, 35, 41, 42, 46, 50, 51, 53, 56, 57, 59, 60 and 62 [CJ 231, 335, 336]
<i>Tonatia bidens</i> (Spix, 1823)	Greater Round-eared Bat	34, 42 and 55 [CMVUNB 1265, CMVUNB 1283]
<i>Tonatia maresi</i> Williams, Willig & Reid, 1995	Maresi Round-eared Bat	7
<i>Trachops cirrhosus</i> (Spix, 1823)	Fringe-lipped Bat	34, 41, 42, 53 and 66 [CJ 19, CJ 493]
<i>Artibeus cinereus</i> (P. Gervais, 1856)	Gervais's fruit-eating Bat	7, 18, 40, 46, 50, 51, 53, 56-58, 60 and 62 [CJ 200, CJ 256]
<i>Artibeus concolor</i> Peters, 1865	Brown Fruit-eating Bat	44, 46 and 50
<i>Artibeus lituratus</i> (Olfers, 1818)	Great Fruit-eating Bat	1, 7, 18, 34, 40-42, 46, 50, 51, 56-58, 60, 62, 64 and 67 [CJ 68, CJ 286, CJ 287]
<i>Artibeus obscurus</i> (Schinz, 1821)	Dark Fruit-eating Bat	34, 42 and 55 [CMVUNB 1178-CMVUNB 1181]
<i>Artibeus planirostris</i> (Spix, 1823)	Flat-faced Fruit-eating Bat	1, 7, 32, 34, 40-42, 46, 50, 51, 56-60, 62, 64 and 67 [CJ 29, CJ 69, CJ 101]
<i>Chiroderma doriae</i> Thomas, 1891	Brazilian Big-eyed Bat	32 and 42
<i>Chiroderma villosum</i> Peters, 1860	Hairy Big-eyed Bat	7, 34 and 42 [UnB 39]
<i>Mesophylla macconnelli</i> Thomas, 1901	Macconnell's Bat	34, 42, 44, 51 and 58 [CJ 12]
<i>Platyrrhinus brachycephalus</i> (Rouk & Carter, 1972)	Short-headed Broad-nosed Bat	32

continue...



## Mammals of Goiás, Brazil

## continuation...

<i>Platyrrhinus incarum</i> (Thomas, 1912)	Incan Broad-nosed Bat	7, 34, 42, 46, 50, 51, 53, 56-58 and 60 [CJ 220, CJ 288, CJ 423]		
<i>Platyrrhinus lineatus</i> (É. Geoffroy, 1810)	White-lined Broad-nosed Bat	1, 7, 18, 26, 28, 31, 32, 34, 35, 40-43, 46, 50, 51, 53, 55-58, 62, 63 and 66 [CMVUNB 1168, CMVUNB 1260]		
<i>Sturnira lilium</i> (É. Geoffroy, 1810)	Little Yellow-shouldered Bat	1, 7, 18, 32, 34, 40-42, 51, 55-58, 60 and 62 [CMVUNB 1250]		
<i>Sturnira tildae</i> de la Torre, 1959	Tilda's Yellow-shouldered Bat	42 and 60 [UnB 1554]		
<i>Uroderma bilobatum</i> Peters, 1866	Tent-making Bat	7, 34 and 42 [UnB 888]		
<i>Uroderma magnirostrum</i> Davis, 1968	Brown Tent-making Bat	7, 34, 42 and 55 [CMVUNB 1278]		
<i>Vampyressa pusilla</i> (Wagner, 1843)	Southern Little Yellow-eared Bat	32, 34, 41, 42 and 45 [CJ 10]		DD
VESPERTILIONIDAE Gray, 1821 (12 species)				
<i>Eptesicus andinus</i> J. A. Allen, 1914	Andean Brown Bat	29 and 30		
<i>Eptesicus brasiliensis</i> (Desmarest, 1819)	Brazilian Brown Bat	1, 27, 28, 34, 35, 40, 42 and 65		
<i>Eptesicus chiriquinus</i> Thomas, 1920	Chiriqui Brown Bat	65		
<i>Eptesicus diminutus</i> (Osgood, 1915)	Little Serotine	7, 51 and 58 [CJ 398, UnB 769]		
<i>Eptesicus furinalis</i> (d'Orbigny & Gervais, 1847)	Argentine Brown Bat	7, 55, 62 and 65 [CMVUNB 1246, CMVUNB 1258]		
<i>Histiotus velatus</i> (I. Geoffroy, 1824)	Tropical Leaf-eared Bat	65 [UnB 1038]		
<i>Lasiurus blossevilli</i> (Lesson, 1826)	Southern Red Bat	1, 40 and 51 [CJ 40, CJ 46, CJ 56]		
<i>Lasiurus villosissimus</i> (Palisot de Beauvois, 1796) *	Hoary Bat	[CJ 399]		
<i>Lasiurus ega</i> (Gervais, 1856)	Southern Yellow Bat	28, 51 and 58 [CJ 229]		
<i>Myotis albescens</i> (É. Geoffroy, 1806)	Silver-tipped Myotis	42, 56 and 65 [CJ 631]		
<i>Myotis nigricans</i> (Schinz, 1821)	Black Myotis	34, 41, 42, 51, 56, 57, 60 and 65 [CJ 326, CJ 381, CJ 382]		
<i>Myotis riparius</i> Handley, 1960	Riparian Myotis	65		
PRIMATES Linnaeus, 1758				
ATELIDAE Gray, 1825 (1 species)				
<i>Alouatta caraya</i> (Humboldt, 1812)	Black-and-gold Howler Monkey	1, 12, 16, 18, 21-23 and 77 [UnB 2061, UnB 2175]		
CALLITHRICHIDAE Gray, 1821 (1 species)				
<i>Callithrix penicillata</i> (É. Geoffroy, 1812)	Black-pencilled Marmoset	19, 21, 22 and 54 [UnB 1116]		
CEBIDAE Gray, 1831 (2 species)				
<i>Sapajus cay</i> (Illiger, 1815)	Pantanal Capuchin	23		VU A2cd
<i>Sapajus libidinosus</i> (Spix, 1823)	Bearded Capuchin	12, 17-19, 22, 26 and 77		
LAGOMORPHA Brandt, 1855				
LEPORIDAE Fischer, 1817 (1 species)				
<i>Sylvilagus minensis</i> Thomas, 1901	Brazilian Cottontail Rabbit	12, 17, 19, 22, 23, 79 and 99 [MN 43003, UnB 2636]	P/R	P/R

continue...

## continuation...

RODENTIA Bowdich, 1821					
CAVIIDAE Fischer, 1817 (4 species)					
<i>Cavia aperea</i> Erxleben, 1777	Brazilian Guinea Pig	1 and 94 [UnB 1625]			
<i>Galea spixii</i> (Wagler, 1831)	Spix's Yellow-toothed Cavy	6 [MN 2615, MN 22583, MZUSP 25304]			
<i>Kerodon acrobata</i> Moojen, Locks & Langguth, 1997	Acrobata Rock Cavy	8 [MN 22728-MN 22730, UnB 2525, UnB 2523]	VU B1ab(iii, v)		DD
<i>Hydrochoerus hydrochaeris</i> (Linnaeus, 1766)	Capybara	1, 12, 16, 17, 19, 21, 22, 25 and 77 [UnB 2247]			
CRICETIDAE Fischer, 1817 (29 species)					
<i>Akodon gr. cursor</i> *	Montane Akodont	82 [AMNH 134567, MN 5176, MZUSP MRT 7903]			
<i>Calomys expulsus</i> (Lund, 1840)	Rejected Vesper Mouse	3, 79, 93 and 110 [MN 61583, MN 61588, MN 71958, UnB 1178]			
<i>Calomys tener</i> (Winge, 1887)	Delicate Vesper Mouse	93 and 110 [MN 61575, MN 67075]			
<i>Cerradomys maracajuensis</i> (Langguth & Bonvicino, 2002)	Maracaju Rice Rat	97 [LBCE 7475]			
<i>Cerradomys marinhos</i> (Bonvicino, 2003)	Marinho's Rice Rat	13, 97, 105 [UnB 1901]			
<i>Cerradomys scotti</i> (Langguth & Bonvicino, 2002)	Lindbergh's Rice Rat	3, 13, 97, 105, 106 and 112 [MN 61674, MN 61684, MN 67089]			
<i>Cerradomys subflavus</i> (Wagner, 1842)	Flavescent Cerradomys	105, 106 and 112 [MN 437, AMNH 134562]			
<i>Euryoryzomys lamia</i> (Thomas, 1901)	Monster Rice Rat	3, 104, 106 and 112 [MN 67090]	EN B1ab(iii)		VU B2ab(i, iii)
<i>Holochilus sciureus</i> Wagner, 1842	Amazonian Marsh Rat	107 [MN 34181]	P/R		P/R
<i>Hylaeamys megacephalus</i> (G. Fischer, 1814)	Large-headed Rice Rat	3, 13, 79, 98 and 106 [MN 46867, MN 46866, MN 67092, UnB 1167]			
<i>Kunsia tomentosus</i> (Lichtenstein, 1830)	Woolly Giant Rat	13 [MN 62579, UnB 1706]			
<i>Neacomys amoenus</i> Thomas, 1903	Common Spiny Mouse	98 [UFPB CRB 70]	P/R		P/R
<i>Necomys lasiurus</i> (Lund, 1841)	Hairy-tailed Bolo Mouse	3, 13, 79 and 82 [MN 46828, MN 67073]			
<i>Nectomys rattus</i> (Pelzeln, 1883)	Common Water Rat	3, 13, 79 and 106 [MN 67075, UnB 383]			
<i>Oecomys catherinae</i> Thomas, 1909	Atlantic Forest Rat	91 and 113 [MN 62174]			
<i>Oecomys cleberi</i> Locks, 1981	Cleber Arboreal Rat	113 [UnB 1716]			DD
<i>Oecomys roberti</i> (Thoms, 1904) *	Robert's Oecomys	82 [MZUSP MRT 7965]			
<i>Oligoryzomys mottogrossae</i> (J. A. Allen, 1916)	Mato Grosso Colilargo	3, 13, 79, 92, 104 and 108 [MN 67089]	P/R		P/R
<i>Oligoryzomys moojeni</i> Weksler & Bonvicino, 2005	Moojen's Colilargo	3 and 104 [MN 50307, MN 67087]			DD
<i>Oligoryzomys nigripes</i> (Olfers, 1818)	Black-footed Colilargo	104 [MN 5210]			
<i>Oligoryzomys rupestris</i> Weksler & Bonvicino, 2005	Highlands Colilargo	3 [MN 50286]	EN B2ac(iii, iv)		DD
<i>Oligoryzomys stramineus</i> Bonvicino & Weksler, 1998	Straw-colored Colilargo	79 [MN 46406, MN 46410]			
<i>Oxymycterus dasytrichus</i> (Schinz, 1821)	Atlantic Forest Hociudo	70 [MN 32890]			
<i>Oxymycterus delator</i> Thomas, 1903	Spy Hociudo	3, 13, 70 and 111 [UnB 2084, MN 46619, MN 71657]			

continue...

## Mammals of Goiás, Brazil

## continuation...

<i>Pseudoryzomys simplex</i> (Winge, 1887)	False Oryzomys	1, 3 and 106 [UnB 2084, MN 46619, MN 71657]		
<i>Rhipidomys macrurus</i> (Gervais, 1855)	Cerrado Rhipidomys	71 and 72 [UnB 1581]		
<i>Rhipidomys cf. mastacalis</i>	Tree Rat	71 and 72 [MN 37350]		
<i>Thalpomys cerradensis</i> Hershkovitz, 1990	Cerrado Mouse	98 [UnB 1157]	VU A2c+3c	
<i>Wiedomys cerradensis</i> Gonçalves, Almeida & Bonvicino, 2005	Cerrado Wiedomys	73 [UnB 2593]		
CUNICULIDAE G. S. Miller & Gidley, 1918 (1 species)				
<i>Cuniculus paca</i> (Linnaeus, 1766)	Lowland Paca	1, 11, 16, 17, 18, 20, 23, 25 and 77 [UnB 2232]		
DASYPROCTIDAE Bonaparte, 1838 (2 species)				
<i>Dasyprocta azarae</i> Lichtenstein, 1823	Azara's Agouti	1, 11, 17-20, 22, 23 and 74 [MN 71690]		DD
<i>Dasyprocta leporina</i> (Linnaeus, 1758)	Red-rumped Agouti	74 [MZUSP 3944]		
ECHIMYIDAE Gray, 1825 (6 species)				
<i>Carterodon sulcidens</i> (Lund, 1838)	Owl's Spiny Rat	10 [MN 54368, UnB 2716]		DD
<i>Clyomys laticeps</i> (Thomas, 1909)	Broad-headed Spiny Rat	13, 96 [UnB 2155, UnB 2717]		
<i>Dactylomys dactylinus</i> (Desmarest, 1817)	Amazon Bamboo Rat	5 [UnB 2067-UnB 2071]		
<i>Proechimys longicaudatus</i> (Rengger, 1830)	Long-tailed Spiny Rat	13 and 98 [MN 71668]		
<i>Proechimys roberti</i> Thomas, 1901	Robert's Spiny Rat	3 [MN 50219, MN 67093]		
<i>Thrichomys pachyurus</i> (Wagner, 1845)	Paraguayan Punaré	3, 79, 95 and 109 [MN 66132]	P/R	P/R
ERETHIZONTIDAE Bonaparte, 1845 (1 species)				
<i>Coendou prehensilis</i> (Linnaeus, 1758)	Brazilian Porcupine	1, 11, 16-19, 21, 23, 75 and 77 [AMNH 134062]		
CARNIVORA Bowdich, 1821				
CANIDAE Fischer, 1817 (4 species)				
<i>Cerdocyon thous</i> (Linnaeus, 1766)	Crab-eating Fox	1, 9, 12, 17-23, 25 and 77 [MN 68181]		
<i>Chrysocyon brachyurus</i> (Illiger, 1815)	Maned Wolf	1, 12, 16-21, 23, 25 and 77 [MN 68175]	VU A3c; E	NT
<i>Lycalopex vetulus</i> (Lund, 1842)	Hoary Fox	1, 16-21, 23, 25 and 77 [MN 68180]	VU A2cd+3cd	
<i>Speothos venaticus</i> (Lund, 1842)	Bush Dog	1, 21 [MN 68179, UnB 3275]	VU C1	NT
FELIDAE Fischer, 1817 (7 species)				
<i>Leopardus braccatus</i> (Cope, 1889)	Pampas Cat	1, 23, 76 and 77 [UnB 2237]	VU C1	NT
<i>Leopardus pardalis</i> (Linnaeus, 1758)	Ocelot	9, 12, 16-20, 22-24, 25 and 77 [UnB 2021]		
<i>Leopardus emiliae</i> (Thomas, 1914)	Emilia Oncilla Cat	114 [MZUSP 19900]		P/R
<i>Leopardus wiedii</i> (Schinz, 1821)	Margay	9, 18, 21 and 23	VU C1	NT
<i>Panthera onca</i> (Linnaeus, 1758)	Jaguar	1, 9, 20 and 77	VU A2bcd+3cd; C1	NT
<i>Puma concolor</i> (Linnaeus, 1771)	Puma	1, 9, 12, 16-20, 22, 23, 25 and 77 [UnB 2026]	VU C1	
<i>Herpailurus yagouaroundi</i> (É. Geoffroy, 1803)	Jaguarundi	1, 18, 21-23, 25 and 77 [UnB 1889]	VU C1	

continue...

## continuation...

MEPHITIDAE Bonaparte, 1845 (1 species)				
<i>Conepatus amazonicus</i> (Lichtenstein, 1838)	Striped Hog-nosed Skunk	17-19, 21 and 77 [MN 59335]	P/R	P/R
MUSTELIDAE Fischer, 1817 (4 species)				
<i>Eira barbara</i> (Linnaeus, 1758)	Tayra	1, 9, 11, 17-23, 25 and 77		
<i>Galictis cuja</i> (Molina, 1782)	Lesser Grison	18 and 19 [MN 68975]		
<i>Lontra longicaudis</i> (Olfers, 1818)	Neotropical Otter	1, 16-19, 21, 23 and 25		NT
<i>Pteronura brasiliensis</i> (Gmelin, 1788)	Giant Otter	[MZUSP 3161, MZUSP 3162]	VU	EN
PROCYONIDAE Gray, 1825 (3 species)				
<i>Nasua nasua</i> (Linnaeus, 1766)	South American Coati	1, 11, 9, 16-22 and 77 [MN 55094]		
<i>Potos flavus</i> (Schreber, 1774)	Kinkajou	24		
<i>Procyon cancrivorus</i> (Cuvier, 1798)	Crab-eating Raccoon	1, 9, 11, 12, 16-19, 21-23, 25 and 77		
PERISSODACTYLA Owen, 1848				
TAPIRIDAE Gray, 1821 (1 species)				
<i>Tapirus terrestris</i> (Linnaeus, 1758)	Lowland Tapir	1, 18- 23, 25 and 77 [MN 53701]	VU A2bcd+3bcd	VU A2cde+3cde
CETARTIODACTYLA Montgelard, Catzeflis & Douzery, 1997				
CERVIDAE Goldfuss, 1820 (4 species)				
<i>Blastocerus dichotomus</i> (Illiger, 1815)	Marsh Deer	1 and 77	VU A4ade	VU A4cde
<i>Mazama americana</i> (Erxleben, 1777)	Red Brocket	1, 12, 18, 19, 23 and 77		DD
<i>Mazama gouazoubira</i> (Fischer, 1814)	Gray Brocket	1, 17, 18, 23, 25 and 77		
<i>Ozotoceros bezoarticus</i> (Linnaeus, 1758)	Pampas Deer	1 and 77 [MN 55093]	VU A4cde; C1	NT
TAYASSUIDAE Palmer, 1897 (2 species)				
<i>Dicotyles tajacu</i> (Linnaeus, 1758)	Collared Peccary	1, 12, 16-19, 21-23, 25 and 77		
<i>Tayassu pecari</i> (Link, 1795)	White-lipped Peccary	1, 23 and 78 [MN 68178, MN 68182]	VU A2bcde+3bcde	VU A2bcde+3bcde
INIIDAE Gray, 1846 (1 species)				
<i>Inia araguaiaensis</i> Hrbek, Farias, Dutra & da Silva, 2014	Araguaian river Dolphin	15	P/R	P/R

\***New record for the state of Goiás.** Sources: 1- Rodrigues et al. (2002); 2- Sanderson & Silveira (2003); 3- Bonvicino et al. (2005); 4- Carmignotto & Monfort (2006); 5- Bezerra et al. (2007); 6- Bezerra (2008); 7- Zortéa & Darc (2019); 8- Bezerra et al. (2010); 9- Calaça et al. (2010); 10- Bezerra et al. (2011); 11- Bernardo & Melo (2013); 12- Ribeiro & Melo (2013); 13- Carmignotto et al. (2014); 14- Colodetti (2014); 15- Hrberk et al. (2014); 16- Araújo et al. (2015); 17- Estrela et al. (2015); 18- Gomes et al. (2015); 19- Hannibal et al. (2015); 20- Cabral et al. (2017); 21- Miranda et al. (2017); 22- Oliveira & Hannibal (2017); 23- Calaça et al. (2018); 24- Miranda et al. (2018); 25- Oliveira et al. (2019); 26- Pelzeln (1883); 27- Vieira (1942); 28- Vieira (1955); 29- Davis (1965); 30- Davis (1966); 31- Piccinini (1974); 32- Coimbra et al. (1982); 33- Trajano & Gnaspini-Netto (1991); 34- Trierveiler 1998; 35- Bredt et al. (1999); 36- Salles et al. (1999); 37- Avilla et al. (2001); 38- Taddei & Uieda (2001); 39- Zortéa (2003); 40- Coelho (2005); 41- Esbérard et al. (2005); 42- Fracasso & Sales (2005); 43- Nunes (2005); 44- Zortéa & Tomaz (2006); 45- Longo et al. (2007); 46- Tomaz (2007); 47- Tomaz et al. (2007); 48- Gregorin et al. (2008); 49- Sodrê et al. (2008); 50- Tomaz & Zortéa (2008); 51- Zortéa & Alho (2008); 52- Silva et al. (2009); 53- Tomaz (2009); 54- Zortéa et al. (2009); 55- Bezerra & Marinho-Filho (2010); 56- Gomes (2010); 57- Zortéa et al. (2010); 58- Graciolli et al. (2010); 59- Chaves et al. (2012); 60- Pina et al. (2013); 61- Oprea (2013); 62- Teixeira et al. (2015); 63- Moratelli & Dias (2015); 64- Assunção (2016); 65- Arias-Aguilar et al. (2018); 66- Bichuette et al. (2018); 67- Benvindo-Souza et al. (2019); 68-Dias & Oliveira (2020); 69- Hope et al. (2019); 70- Oliveira & Gonçalves (2015); 71- Andrades-Miranda et al. (2002); 72- Tribe (2015); 73- Bezerra et al. (2013); 74- Patton & Emmons (2015); 75-Voss (2015); 76- Bagno et al. (2004); 77- Giozza et al. (2017); 78- This study; 79- Bonvicino et al. (2002); 80- Carvalho et al. (2002); 81- Costa et al. (2003); 82- Carmignotto (2005); 83- Cáceres et al. (2008); 84- Brandão et al. (2014); 85- Pavan et al. (2014); 86- Voss et al. (2018); 87- Silva et al. (2019); 88- Creighton & Gardner (2008); 89- Patton & Silva (2008); 90- Pine & Handley (2008); 91- Carleton & Musser (2015); 92- Weksler et al. (2017); 93- Salazar-Bravo (2015); 94- Dunnun (2015); 95- Pessôa et al. (2015); 96- Bezerra & Oliveira (2010); 97- Bonvicino et al. (2014); 98- Bonvicino et al. (1996); 99- Bonvicino et al. (2015); 100- Caramaschi et al. (2011); 101- Faria et al. (2013a); 102- Faria et al. (2013b); 103- Fonseca & Astúa (2015); 104- Moreira et al. (2020); 105- Percequillo et al. (2008); 106- Prado & Percequillo (2013); 107- Prado et al. (2021); 108- Weksler et al. (2017); 109- Basile (2003); 110- Bonvicino & Almeida (2000); 111- Oliveira (1998); 112- Percequillo (1998); 113- Suárez-Villota et al. (2018); 114- Nascimento & Feijó (2017); 115- Feijó et al. (2018).[see Supplementary Material S1 for cited references].

(Marinho-Filho et al. 1997; Bocchiglieri et al. 2010; Marinho-Filho & Guimarães 2010; Feijó et al. 2015) and had been mentioned in other studies as of potential occurrence for the state (Anacleto et al. 2006; Gutiérrez & Marinho-Filho 2017). A visual observation (photo in Supplementary Material S2) of an adult specimen was done in the Mambai region by a researcher (D. Sampaio) in 2013, corroborating the presence of *T. tricinatus*, and representing a new record for Goiás (Table 1). This species has been classified as endangered in the Brazilian red list (Reis et al. 2018) and vulnerable in the IUCN red list (IUCN 2020).

In general, species of Cingulata listed for the state are common and widely distributed, being found in different types of environments and domains. The nine-banded armadillo (*Dasyus novemcinctus*) and the yellow armadillo (*Euphractus sexcinctus*) are the most frequent species (Rodrigues et al. 2002; Bernardo & Melo 2013; Calaça et al. 2018; Feijó et al. 2018), being tolerant to disturbed environments, although they are rare in places where they suffer intense hunting pressure (Cabral et al. 2017). We consider *Cabassous squamicaudis* as a full species as treated by Feijó & Langguth (2013). This species co-occurs with *Cabassous tatouay* in Goiás (Rodrigues et al. 2002; Sanderson & Silveira, 2003; Rocha et al. 2019) and, as well as for other species of armadillos, the number of records varied between studies, depending on the type of habitat, and the degree of conservation of surveyed areas. *Tolypeutes tricinatus* and *C. tatouay* were the rarest species throughout its range in Cerrado, including Goiás (Anacleto et al. 2006; Ubaid et al. 2010).

Studies on armadillos remain incipient in Goiás, but the studies evaluating the ecology of the giant armadillo *Priodontes maximus* are worth mentioning, developed in the Parque Nacional das Emas (Silveira et al. 2009; Vynne et al. 2009). Considered as the largest and most conspicuous armadillo species, *P. maximus* generally is more sensitive, being recorded in more preserved environments of the Cerrado (Anacleto & Marinho-Filho 2001; Silveira et al. 2009; Carter et al. 2016; Lemos et al. 2020). According to Anacleto & Marinho-Filho (2001), high densities of the species can be observed in Goiás, but their populations have been drastically reduced, being listed as vulnerable (VU) (ICMBio/MMA 2018; IUCN 2020). Habitat loss, fragmentation, fires and roadkill are the main threats for the species (Silveira et al. 1999; Hannibal et al. 2018; Lemos et al. 2020).

We reinforce the north and northeastern areas of the state as regions of knowledge gaps for Cingulata, mainly the Paranã Valley, as well as the southwestern of Goiás, including the region of Serranópolis and Serra do Caiapó. This latter region was informally mentioned as area of occurrence of *T. matacus*, but requires further studies to confirm the presence of this species.

### 3. Pilosa

Only two species of the order Pilosa occur in Goiás state, the giant anteater (*Myrmecophaga tridactyla*) and the southern tamandua (*Tamandua tetradactyla*), both representing the family Myrmecophagidae. These species comprised 16.6% of Pilosa members found in Brazil (Quintela et al. 2020). In other Brazilian states, Pilosa richness varied from one (in Santa Catarina – Cherem et al. 2004) to five species (in Amapá – Silva et al. 2013, and Mato Grosso – Brandão et al. 2019).

Giant anteaters are considered common in Goiás state, being a frequently registered species in mammalian studies conducted in the region (Rodrigues et al. 2002; Gomes et al. 2015; Cabral et al. 2017; Oliveira et al. 2019). Concerning locomotor habits, *M. tridactyla* is terrestrial and *T. tetradactyla* is scansorial (Paglia et al. 2012), but both occur in open (open grasslands

and scrubland) and forested areas (woodland savanna, semideciduous and riparian forests). However, *M. tridactyla* prefers open formations, while *T. tetradactyla* selects forested areas (Desbiez & Medri 2010).

The giant anteater is categorized as a vulnerable species (ICMBio/MMA 2018; IUCN 2020). Human activities such as agriculture, deforestation, hunting, roadkill, and fire are the main threats for population establishment (Miranda et al. 2014a). On the other hand, *T. tetradactyla* is classified as Least Concern, even though the knowledge on its population density is scant. This species suffers the same threats as those cited for *M. tridactyla* (Miranda et al. 2014b).

### 4. Chiroptera

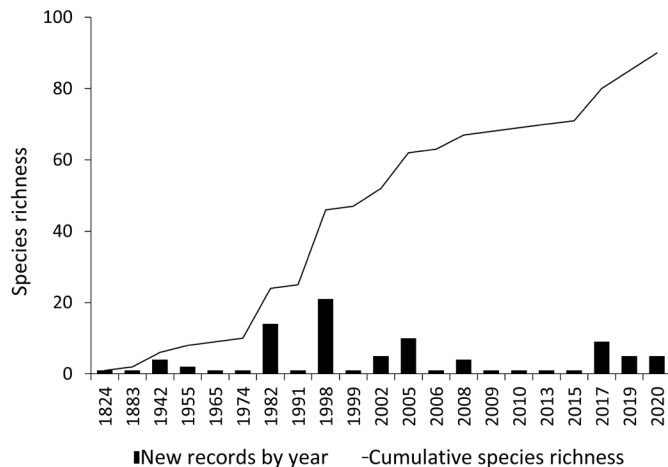
We recorded 90 species of bats including five new records for the Goiás state. Only Thyropteridae, one of the nine families occurring in Brazil, has not yet been registered in the state. Phyllostomidae is the most speciose family (49 spp.), followed by Molossidae (14 spp.), Vespertilionidae (12 spp.), Emballonuridae (8 spp.), Mormoopidae (3 spp.), Noctilionidae (2 spp.), Furipteridae (1 sp.), and Natalidae (1 sp.).

The first bat collected in the region currently corresponding to Goiás state dates back to 1819, by Auguste de St-Hilaire (I. Geoffroy St.-Hilaire 1824). In his study, Isidore St-Hilaire describes the species *Vespertilio hilarii*, later synonymized as *Eptesicus brasiliensis* (Carter & Dolan 1978; Gardner 2008). Gervais (1855) cited the occurrence of six species for Goiás based on F. Castelnau's expedition to the "Province of Goiás". One of the species, *Vespertilio chiloensis* (= *Myotis chiloensis*), was not considered here because it must be an incorrect identification, since the species has a distribution restricted to Chile and southwestern Argentina (Gardner 2008). The third record was made in 1823 by Dr. Johann Emanuel Pohl, on an expedition to Goiás (Pelzeln 1883). The only city in Goiás mentioned by Pelzeln is the old state capital, Goiás city. However, the exact locality of the record is imprecise, since the expedition entered the state along the border with Minas Gerais state, along the Rio das Velhas, and proceeded in the direction to the river that, according to this author, is probably the Araguaia River (Pelzeln 1883).

The panorama of the number of bat species registered for Goiás over the years shows four peaks, with the highest increase in 1982, 1998, 2005, and 2017-2020 (Figure 2). The first increment concerns to the study of Coimbra et al. (1982), with the contribution to the zoogeography and ecology of bats in Cerrado regions of central Brazil. In 1998, a single study added 21 new species. It refers to Fernanda Trierweiler's unpublished master dissertation in the Serra da Mesa hydroelectric reservoir region, in northern Goiás (Trierweiler 1998). Moreover, five articles published in 2005 resulted in the third peak of species addition with 11 new records, 64% of those by Fracasso & Salles (2005). This paper stands out for being the only one based on fossil material and including recent (non-fossil) material deposited in a scientific collection (the Museu Nacional, Universidade Federal do Rio de Janeiro, MN). Bezerra & Marinho-Filho (2010) added five new records (*Diphylla ecaudata*, *Tonatia bidens*, *Artibeus obscurus*, *Uroderma magnirostrum* and *Eptesicus furinalis*), based on voucher specimens collected mainly at limestone outcrops of northeastern Goiás. More recently, 18 additional species have been reported (Arias-Aguilar et al. 2018; Hope et al. 2019; Zortéa & Darc 2019; Dias & Oliveira 2020; Hintze et al. 2020; present study).

Arias-Aguilar et al. (2018) added eight species, and the new species recorded can be attributed to the sampling methodology used by the





**Figure 2.** Temporal trend in cumulative species richness for Chiroptera in Goiás state. The 2020 year refers to the present study.

authors, which was the acoustic recording. This is the first bioacoustic study applied to survey bats in the state of Goiás. The most recent study published with Chiroptera in Goiás was that of Zortéa & Darc (2019), which surveyed the central-northern portion of the state (Ceres, Rialma, and Pilar de Goiás localities), adding four new records to the state. Dias & Oliveira (2020) provided the first record of *Xeronycteris vieirai* for the state, and the present study added five new occurrences with data obtained from the collection of the Universidade de Brasília, UnB (*Eumops perotis*, *Nyctinomops laticaudatus*, and *Hsunnycteris thomasi*) and the Universidade Federal de Jataí, CJ (*Eumops glaucinus* and *Lasiurus villosissimus*).

In general, the new records added here are expected, since these species occur within neighboring states (Bianconi & Pedro 2017; Sartore et al. 2017; Zortéa et al. 2017). It is important to mention that the previous record of *E. perotis* for Goiás, provided by Sartore et al. (2017) and based on the study of Eger (1977), is erroneous. Eger (1977) refers to the material deposited at the Institut Royal des Sciences Naturelles de Belgique (IRSNB) that was attributed to a location in Goiás state named “Parano do Manhana” (sic). In a careful investigation, Suckow et al. (2010) rectified this information indicating that the correct location is “Paraná do Manhana”, a locality in the upper Amazonas River. Bichuette et al. (2018) registered 66 species in a recent review of bats from Goiás and the Federal District. Two species considered by these authors were not considered in our study: *Cynomops abrasus* and *Histiotus laephotis*. Although these species are likely to occur in Goiás, especially *C. abrasus*, we have not found supporting material to attest their occurrence in the state.

The order Chiroptera is one of the most representative of mammals globally, a pattern reflected in Brazil, and also in this study. According to Aguiar et al. (2016), at least 118 species occur in the Cerrado, of which 76% occur in Goiás, as found in the present study. Concerning Brazil, Goiás comprises about 50% of the 181 recognized species (see Garbino et al. 2020). These figures show that Goiás state presents a high bat species diversity, playing a significant role for the conservation of this group in Brazil.

Comparatively to other Brazilian states, bat species richness found in Goiás is only surpassed by the observed in the states of Pará (120 spp.), Amazonas (110 spp.) (Bernard et al. 2011), and Mato Grosso (99 spp.-Brandão et al. 2019), which owns more than 8% of its territory within the Amazon domain. Mato Grosso do Sul holds 73 species (Tomas et al. 2017), while São Paulo presents 79 species (Vivo et al. 2011).

The family Phyllostomidae is the most diverse in Brazil (93 spp.-Garbino et al. 2020), a pattern reflected in our study. Phyllostomidae bats are most commonly captured in the understory with mist nets, the country’s most-used capturing method (Delgado-Jaramillo et al. 2020). Families such as Molossidae and Vespertilionidae are also diverse, but they demand complementary methods to be registered (e.g., bioacoustics inventory), which is still rarely used in Brazil. Other species not registered in Goiás are likely to occur due to close records in the state’s frontiers, as the record of *Pygoderma bilabiatum* in the IBGE’s Reserve in the city of Brasília, Federal District (Schneider et al. 2011).

Regarding endemism, three species considered endemic to the dry diagonal of Brazil [*Lonchophylla bokermanni*, *Lonchophylla dekeyseri* (Cerrado), and *Xeronycteris vieirai* (Cerrado and Caatinga)] are found in Goiás (Aguiar et al. 2010; Zortéa et al. 2017; Dias & Oliveira 2020).

We found registers of seven threatened bat species in Goiás, six of which are included in the Brazilian red list (ICMBio/MMA 2018): *Furipterus horrens* (Vulnerable), *Natalus macrourus* (Vulnerable), *Glyphonycteris behnii* (Vulnerable), *Lonchophylla dekeyseri* (Endangered), *Lonchorhina aurita* (Vulnerable), and *Xeronycteris vieirai* (Vulnerable). IUCN lists *Lonchophylla dekeyseri* and *L. bokermanni* as Endangered (Aguiar 2016; Aguiar & Bernard 2016), but the Brazilian red list does not include *L. bokermanni* in any threat category. *Glyphonycteris behnii*, *X. vieirai*, *Eumops maurus* and *Vampyressa pusilla* are classified as data deficient according to IUCN red list (IUCN 2020).

Despite the remarkable diversity of bats reported here, Goiás still stands out as one of the Brazilian states with the lowest bat sampling locations (Bernard et al. 2011), thus it is indicated by Aguiar et al. (2020) as a priority area for bat inventories. Bat records are concentrated mainly in the southern and eastern portions of the state (Mambai region) (Figure 1). The number of species can be higher, if we consider the lack of bioacoustic studies. For example, in addition to the 20 species recorded by Arias-Aguilar et al. (2018), several sonotypes were not identified by them, including complexes from several families.

Many of the Cerrado areas were converted into agriculture, especially soy monoculture, which reduced this domain to just 20% of the original area (Strassburg et al. 2017). Goiás is home to a large portion of the Cerrado domain. Currently, the economy model based on agriculture affects bat assemblages changing habitat structure and leading to reduced shelter and food availability, which can potentially cause local and even permanent extinctions according to a climate modeling study (Aguiar et al. 2016). In addition, the reduction of habitat availability imposed by the expansion of agriculture contributes to the loss of environmental quality. This scenario favors the susceptibility of contact with pollutants in water resources, in the air, and in ingested food (Bayat et al. 2014; Souza et al. 2020), which can jeopardize animal immune responses and increase the chances of contracting diseases, leading to the decline of bat populations (Naidoo et al. 2016; Miguel et al. 2019).

There are indications that the southern and southeastern parts of the Cerrado (including areas in Goiás) are potential regions of high habitat suitability for many bat species in a dispersion scenario motivated by climate change (Aguiar et al. 2016). This adds value to the region for long-term conservation of chiropterans and further emphasizes the need for inventory efforts and updating species richness and distribution in the state. These data are essential for elaborating effective landscape management strategies to guarantee the persistence of suitable habitats

for bat species and their ecosystem services, such as pollination, agricultural pest predation, and seed dispersion.

### 5. Primates

We recorded four primate species in Goiás state, belonging to three genera and three families, which represents only 2.7% of this group diversity in the country (Jerusalinsky & Melo 2018). In the Brazilian states, richness of primates varied from three (in Santa Catarina – Cherem et al. 2004) to 25 species (Mato Grosso – Brandão et al. 2019). Primate richness in the Cerrado is considered lower (5 spp.) compared to Amazon and Atlantic Forest (Paglia et al. 2012).

The four primate species recorded here are common in its geographical range. *Alouatta caraya*, *Sapajus libidinosus* and *Callithrix penicillata* are abundant in Goiás, and display great environmental plasticity, occurring even in urban fragments (Grande et al. 2020). Black-pencilled marmosets can reach high densities and be more common in degraded areas (Grande et al. 2020), and were not registered in protected areas such as Parque Nacional das Emas (Rodrigues et al. 2002), and Chapada dos Veadeiros (Ferregueti et al. 2019). The geographical distribution of *Sapajus cay* reaches Goiás state (IUCN 2020), where it was recorded in Atlantic Forest enclaves in the municipalities of Apore and Itajá, southwestern of the state (Calaça et al. 2018; Gusmão et al. 2018). Habitat loss has been the main threat for capuchin monkeys. In the last 48 years, the populations of *S. cay* declined about 30%, which led the species to be currently categorized as Vulnerable in the Brazilian red list (Rímoli et al. 2018).

### 6. Carnivora

In Goiás state, richness of Carnivora order was extremely representative, with five families, 15 genera and 19 species. In comparative terms with Brazilian Carnivora richness, these data represent 53% of total species (36 spp., Quintela et al. 2020). When compared to other state lists, Goiás ranges around 90-95% of Carnivora species found in Mato Grosso (21 spp., Brandão et al. 2019) and Mato Grosso do Sul states (20 spp., Tomas et al. 2017). In contrast, Goiás holds two more Carnivora species than São Paulo (17 spp., Vivo et al. 2011), and six more than Amapá state (13 spp., Silva et al. 2013). The species found here correspond to 90% of carnivora mammals recorded for the Cerrado (21 spp., Paglia et al. 2012).

Most carnivores species listed for Goiás present a large geographic distribution in Neotropical region (IUCN 2020). In the Cerrado domain, *Cerdocyon thous*, *Chrysocyon brachyurus*, *Speothos venaticus*, *Leopardus pardalis*, *L. emiliae*, *L. wiedii*, *Herpailurus yagouaroundi*, *Puma concolor*, *Panthera onca*, *Nasua nasua*, *Procyon cancrivorus*, *Galictis cuja* and *Eira barbara* occur in open and forested environments, covering several physiognomies (Juarez & Marinho-Filho 2002; Marinho-Filho et al. 2002; Leuchtenberger et al. 2013; Lima et al. 2014). On the other hand, species such as *Lontra longicaudis* and *Pteronura brasiliensis* inhabit mainly forests (Leuchtenberger et al. 2013), while *Lycalopex vetulus*, *Leopardus braccatus* and *Conepatus amazonicus* occur almost exclusively in open areas (Juarez & Marinho-Filho 2002; Marinho-Filho et al. 2002; Feijó & Langguth 2013; Nascimento et al. 2021). Recently, Miranda et al. (2018) recorded an individual of *Potos flavus* roadkilled over a highway in southwest Goiás, adding a recent record for the state, and corroborating its presence for the Cerrado. The kinkajou occurs exclusively in forested habitats (Marinho-Filho et al.

2002), and this individual was close to a forest, which reinforces the importance of conservation of these physiognomies in the Brazilian savanna (Miranda et al. 2018).

We recorded 47.4% (9 spp.) of carnivora categorized as vulnerable (*C. brachyurus*, *L. vetulus*, *S. venaticus*, *L. braccatus*, *L. wiedii*, *P. onca*, *H. yagouaroundi*, *P. concolor* and *P. brasiliensis*) according to the Brazilian Red List (ICMBio/MMA 2018). Carnivora is the most threatened Brazilian mammal group, being habitat destruction the biggest challenge for the conservation of these animals. In the Atlantic Forest, Carnivora species richness is affected by the amount of native vegetation cover (Regolin et al. 2017). In the Cerrado, there is higher occupancy of *C. brachyurus* and *P. concolor* in strictly protected areas (Ferreira et al. 2020). Further, the conflict with humans (i.e., retaliation), roadkills, urbanization, fires and diseases are other concerns about Carnivora conservation (Beisiegel 2017).

### 7. Perissodactyla

The lowland tapir (*Tapirus terrestris*) represents the unique species of Perissodactyla confirmed for Goiás. The species is widely distributed in Brazil and common in several regions of the state, recorded in open and forested environments, as well as in crop lands (Rodrigues et al. 2002; Cabral et al. 2017; Oliveira et al. 2019). However, in southeastern Goiás, the presence of lowland tapir is rare, occurring only in landscapes with higher native habitat amount (Rocha et al. 2018). Lowland tapir is nationally and globally threatened, categorized as vulnerable (ICMBio/MMA 2018; IUCN 2020). According to the Brazilian red list (ICMBio/MMA 2018), *T. terrestris* reaches different threatened categories across the Brazilian domains (e.g., regionally extinct - Caatinga, endangered - Cerrado and Atlantic Forest, near threatened - Pantanal, and least concern - Amazon) (Medici et al. 2018). In the Brazilian Cerrado, agricultural expansion and consequent low percentage of native remnants are the highest threats to lowland tapir populations (Medici et al. 2012).

### 8. Cetartiodactyla

We recorded seven species of Cetartiodactyla for Goiás state, representing only 12% of the group species richness cited for Brazil (Quintela et al. 2020). This richness is similar to those registered in other states of the country, with six species in Mato Grosso do Sul (Tomas et al. 2017) and nine species in Mato Grosso (Brandão et al. 2019), but lower than richness found in other states that harbor aquatic mammal species (e.g., São Paulo, with 33 species – Vivo et al. 2011). Collared peccary and White-lipped peccary, species of Tayassuidae, present a wide geographical range in the Brazilian territory (Desbiez et al. 2012; Keuroghlian et al. 2012). *Dicotyles tajacu* is more resistant to environmental degradation, managing to survive even in devastated areas (Sowls 1997; Desbiez et al. 2012), while *Tayassu pecari* in Brazil is classified as vulnerable (Keuroghlian et al. 2018). This species is in peril in regions most impacted by human action such as southeastern Goiás, where the most recent records date from approximately ten years ago (Keuroghlian et al. 2012).

*Mazama americana* and *M. gouazoubira* are considered common, occurring in all domains of Brazil, with the red brocket evaluated as data deficient, and the gray deer as least concern in the IUCN Red List (Duarte et al. 2012a; b; Duarte & Vogliotti 2016). *Ozotoceros bezoarticus* is classified as vulnerable in Brazil, due to population decline and geographical isolation

(Gonzalez et al. 2010; Duarte et al. 2012c; Duarte et al. 2018) and as near threatened in the IUCN Red List (González et al. 2016). Despite being very common in some areas in the southwestern region of Goiás (Rodrigues et al. 2002), the subspecies *Ozotoceros bezoarticus bezoarticus* is considered vulnerable due to a 98% decrease in its distribution area, which depends on preserved open vegetation formations in the Cerrado (Weber & Gonzalez 2003; Duarte & Gonzalez 2010; Duarte et al. 2012c). *Blastocerus dichotomus* is the largest species of deer in Brazil, being classified as vulnerable in national and international red lists (Duarte et al. 2012d, 2016, 2018). It inhabits floodplains of the great rivers and their affluents. The highest concentrations of marsh deer can be observed in the Pantanal and in the region of Ilha do Bananal in the Araguaia River (Tiepolo & Tomas 2009; Duarte et al. 2012d).

*Inia araguaiaensis* was recently described as a distinct species of *Inia*, being restricted to the Araguaia-Tocantins basin (Hrbek et al. 2014; Siciliano et al. 2016). Although its status is not yet recognized by the IUCN and Ministério do Meio Ambiente (MMA), Hrbek et al. (2014) suggest the classification to be considered as vulnerable due to the great threats in its occurrence area, such as agricultural and industrial development, and hydroelectric dams, that contributes to the fragmentation of populations.

## 9. Lagomorpha

The Lagomorpha order is represented by a single genus in Brazil, *Sylvilagus*, which was treated as monotypic, represented by *S. brasiliensis* with several subspecies until recently. Currently, this complex taxonomic history began to be elucidated based on phylogenetic relationships among South American populations. Ruedas et al. (2017) recognized at least three distinct species for the country: *S. brasiliensis*, *S. minensis* and *S. tapetillus*, with other taxonomic issues yet to be clarified (Silva et al. 2019b). In Goiás state, only *S. minensis* is expected to occur (Bonvicino et al. 2015; Ruedas et al. 2017). In general, Brazilian cottontail rabbits are considered common, with a wide distribution and preference for edges of forest habitats, although they are also recorded in open environments, bamboo forests and disturbed areas (Emmons & Feer 1997; Silva Júnior et al. 2005; Borges et al. 2014; Dias et al. 2019). *Sylvilagus minensis* was one of the most common medium-large mammal species recorded in fragmented areas of the southwestern region of the state (Gomes et al. 2015; Rocha et al. 2018), being associated with forest environments (Gomes et al. 2015). However, the species was not recorded in some conservation units, such as the Parque Nacional das Emas (Rodrigues et al. 2002) and the Parque Nacional Chapada dos Veadeiros (Ferregueti et al. 2019), which present a predominance of shrublands. Due to recent taxonomic rearrangements, *S. minensis* has not yet been evaluated by the IUCN and MMA.

## 10. Rodentia

A total of 29 genera and 43 species, belonging to six rodent families, occur in Goiás state. These species and families are divided in two infraorders (*sensu* D'Elia et al. 2019), as follows: infraorder Hystricognathi, including the families Caviidae (4 spp.), Cuniculidae (1 sp.), Dasyproctidae (2 spp.), Echimyidae (6 spp.), and Erethizontidae (1 sp.); and infraorder Myomorpha, represented only by the family Cricetidae (29 spp.). The total number of species represents ca. 16% of the 258 rodent species of Brazil (Quintela et al. 2020). This richness is comparable to that found in other Brazilian states (*e.g.*, Rio de Janeiro state - 49 spp.; Rocha et al. 2004), which ranges from 33 species in Mato Grosso do Sul (Tomas et al. 2017) to 67 species in Mato Grosso state (Brandão et al. 2019). Below we describe the rodent richness in both infraorders.

### 10. 1. Hystricognathi

Seven rodent families represent the infraorder Hystricognathi in Brazil, being five of them found in Goiás state. Among these families, we account a total richness of 12 genera and 14 species, distributed as described above. Comparing to other states of central-western Brazil, this richness fits in a range of nine genera and 10 species in Mato Grosso do Sul (Tomas et al. 2017) to 15 genera and 20 species in Mato Grosso state (Brandão et al. 2019).

Concerning the general distribution patterns in Goiás state, 64% (9 spp.) of the Hystricognathi species are forest vegetation inhabitants, with six species widely distributed (*i.e.*, *Cavia aperea*, *Coendou prehensilis*, *Cuniculus paca*, *Dasyprocta azarae*, *Dasyprocta leporina*, and *Hydrochoerus hydrochaeris*), occurring on the forested environments of the Cerrado, as well as in other domains of Brazil, especially in the Atlantic Forest (Patton et al. 2015). Two exceptions regarding widely distributional ranges are *Cavia aperea*, which has no records in Amazon (Dunnun 2015), and *Dasyprocta leporina*, with no records in Pantanal and Caatinga (Patton & Emmons 2015). Three species with restricted range distribution in the state also inhabit forested formations, being two species only shared between Cerrado and Amazon (*i.e.*, *Dactylomys dactylinus* – Bezerra et al. 2007, and *Proechimys roberti* – Patton & Leite 2015), and one species shared among Cerrado, Pantanal, and Amazon (*i.e.*, *Proechimys longicaudatus* – Patton & Leite 2015).

Species occurring in open vegetation domains account for 36% of the total (5 spp., *i.e.*, *Galea spixii*, *Carterodon sulcidens*, *Clyomys laticeps*, *Kerodon acrobata*, and *Thrichomys pachyurus*). In this group, we have the only Hystricognathi species found in Goiás state that are Cerrado endemics (3 spp.): *Carterodon sulcidens*, distributed in eastern Goiás (Bezerra et al. 2011); *Kerodon acrobata*, restricted to north and northeastern Goiás (Moojen et al. 1997; Bezerra et al. 2010; Zappes et al. 2014); and *Thrichomys pachyurus*, ranging throughout Goiás, except the southern end of the state (Nascimento et al. 2013; Bonvicino et al. 2020 – specimens with  $2n = 30$ ,  $FN = 56$ ). In regards to the remaining two species, one is shared between Cerrado and Caatinga (*Galea spixii* – Bezerra 2008), and the other between Cerrado and Pantanal (*Clyomys laticeps* – Bezerra & Oliveira 2010).

Regarding the conservation status, two species are considered under some threaten level. The narrowly distributed species *Kerodon acrobata*, figures as vulnerable at Brazilian red list, and as data deficient in the IUCN, due mainly to habitat loss and illegal hunt, since it is a game species (Bezerra et al. 2010, Roach 2016). The second species, *Dasyprocta azarae*, is classified as data deficient in the IUCN Red List, but faces population decline tendency due to decreasing number of mature individuals, habitat loss and illegal hunt (Catzeffis et al. 2016).

There are some taxa needing taxonomic review. *Galea spixii* have proven to be a species complex, composed of distinct morphological groups, and needs to be studied based on molecular data, including the description and redescription of some taxa (Bezerra 2008; Dunnun 2015); *G. flavidens* (Brandt, 1835) listed for Goiás by Bonvicino et al. (2005), is not considered here since it has no designated holotype, and “Brasil” as type locality (Brandt 1835), and can be considered a synonym of the fossil species *Cavia bilobidens* (Winge, 1888), which is considered related to *G. spixii* (Paula Couto 1950, Bezerra 2008); *Proechimys* is the most speciose genus of the family Echimyidae and needs revision in both molecular and morphological grounds, including here the represented species groups *P. longicaudatus* and *P. guyannensis*, which includes *P. longicaudatus* and *P. roberti*, respectively (Patton & Leite 2015).



## 10.2. Myomorphi

The highly diverse infraorder Myomorphi is represented in Brazil by the family Cricetidae, subfamily Sigmodontinae (Patton et al. 2015). We recorded 17 genera and 29 species for Goiás state, belonging to five tribes (*sensu* Salazar-Bravo et al. 2016): Akodontini (6 spp.), Oryzomyini (18 spp.), Phyllotini (2 spp.), Thomasomyini (2 spp.), and Wiedomyini (1 sp.). This number of sigmodontine species is similar to the ones found in other Brazilian states, such as Rio de Janeiro, with 32 species (Rocha et al. 2004), and Mato Grosso do Sul, with 22 species (Tomas et al. 2017), but is lower than that found in Mato Grosso state, with 42 species (Brandão et al. 2019).

In relation to general distribution patterns, 10% (3 spp.) of Cricetidae species are widely distributed and are shared between the Cerrado and forested domains such as the Amazon and Atlantic Forests. This is the case of *Necomys lasiurus*, *Nectomys rattus*, and *Pseudoryzomys simplex*. Species occurring in Cerrado and Atlantic Forest domains represent 38% (11 spp., *Akodon* gr. *cursor*, *Calomys tener*, *Cerradomys subflavus*, *Oecomys catherinae*, *Oligoryzomys mattogrossae*, *Oligoryzomys rupestris*, *Oligoryzomys stramineus*, *Oligoryzomys nigripes*, *Oxymycterus dasytrichus*, *Rhipidomys macrurus* and *Rhipidomys mastacalis*), and in Cerrado and Amazon, 14% (4 spp., *Cerradomys maracajuensis*, *Hylaeamys megacephalus*, *Neacomys amoenus* and *Oecomys roberti*). The remaining species, 24% (7 spp.), are Cerrado endemics (*Cerradomys marinhui*, *Euryoryzomys lamia*, *Holochilus sciureus* [*sensu* Prado et al. 2021], *Oecomys cleberi*, *Oligoryzomys moojeni*, *Thalpomys cerradensis* and *Wiedomys cerradensis*) or are shared between Cerrado and other open formations, such as Chaco, Pampas or Caatinga, representing 14% (4 spp., *Calomys expulsus*, *Cerradomys scottii*, *Kunsia tomentosus* and *Oxymycterus delator*).

Some species are known from only one locality in Goiás, as is the case of: *Cerradomys maracajuensis*, recorded at Serranópolis, southern Goiás; *Kunsia tomentosus*, recorded only at Parque Nacional das Emas, in southwestern Goiás; *Neacomys amoenus*, recorded in Baliza, at western Goiás; *Oligoryzomys rupestris*, a species with a disjunct distributional range, and endemic to highly elevated rupestrian grasslands, recorded in Parque Nacional da Chapada dos Veadeiros at northern Goiás; *Akodon* gr. *cursor*, *Oecomys roberti* and *Oxymycterus dasytrichus*, all recorded only in the region known as 'Mato Grosso de Goiás' at the central portion of Goiás state; and *Wiedomys cerradensis*, recorded in São Domingos, eastern Goiás. Other species, typical of forested formations, also have few records in the state, such as *Euryoryzomys lamia*, restricted to eastern Goiás.

Here we provide the first published records for *Akodon* gr. *cursor* and *Oecomys roberti* based on examined material housed at scientific collections. These records are for Anápolis (*Akodon* gr. *cursor*) and Petrolina de Goiás (*Oecomys roberti*) (see Carmignotto, 2005; Table 1 – present study).

Among the abovementioned species, five are classified under some threaten category, being two of them classified as endangered in the Brazilian red list (*Euryoryzomys lamia* and *Oligoryzomys rupestris*) and one as vulnerable (*Thalpomys cerradensis*). The IUCN red list accounts for four species, being three classified as data deficient (*Oecomys cleberi*, *Oligoryzomys moojeni*, *Oligoryzomys rupestris*) and one as vulnerable (*Euryoryzomys lamia*). Among the cricetid rodents of Goiás state, the later species, *Euryoryzomys lamia* is included in the more severe threaten categories of both Brazilian and IUCN red lists. This species has occupancy area of less than 2,000 km<sup>2</sup> and is known from

only four locations, two of them are already completely destroyed due to agriculture (Percequillo & Weksler 2018). All threatened and data deficient species have in common the relatively small distribution, habitat loss due to conversion for agribusiness, and a few or no population study (see ICMBio/MMA 2018, IUCN 2020).

There are some species needing taxonomic review: *Rhipidomys macrurus* and *Rhipidomys mastacalis* have proven to be species complexes, composed of taxa morphologically similar, but distinct at molecular levels (Costa et al. 2011; Lanes 2020), as well as *Oecomys catherinae* (Suárez-Villota et al. 2018). So, specimens from Goiás cited as *Oecomys trinitatis* by Carleton and Musser (2015) and as *Oecomys rex* by Costa (2001), as well as those cited as *Oecomys* sp.1 (2n = 60), *O. trinitatis* (2n = 54) and *Oecomys* gr. *catherinae* (morphological data) by Carmignotto (2005), refer to *O. catherinae* species complex of Suárez-Villota et al. (2018), represented by at least two distinct lineages in the state. A specimen (MN 36150 from 55 km N Niquelândia, GO) cited by Andrades-Miranda et al. (2000) with 2n = 60 and FNa = 64, and treated as *Hylaeamys yunganus* (see also Moreira et al. 2020), was not included in the present checklist, since the voucher material was not examined by us nor other authors working with this genus (Prado & Percequillo 2013; Percequillo 2015), being its taxonomic identity waiting to be confirmed.

The rodent fauna of Goiás state is also a composite, characterized by inhabitants of forested and open formations due to the presence of a vegetation mosaic (grasslands, shrublands, and forests) typical of the Cerrado domain (Carmignotto et al. 2012), and also by the presence of Seasonally Dry Tropical Forest remnants that still persist in the state (Ribeiro & Walter 2008; IBGE 2011). The connection between the Atlantic Forest and Amazon through forest formations of the Cerrado is already described (Costa 2003), as well as the mammal fauna shared between Cerrado and Caatinga (Carmignotto et al. 2012). Richest rodent communities were found in conservation units, such as the Parque Nacional das Emas (13 spp., Carmignotto et al. 2014) and the Parque Nacional da Chapada dos Veadeiros (14 spp., Bonvicino et al. 2002, 2005), as well as in regions under hydroelectric dam projects, such as the Serra do Fação dam reservoir (16 spp., Gomes et al. 2015) and the Serra da Mesa dam reservoir (12 spp., Carmignotto 2019), at southeastern and northeastern of Goiás state, respectively. Furthermore, a significant number of species is also found in areas of extensive cattle ranching intermixed with natural landscapes, such as the Cadoz farm (11 spp., Bonvicino et al. 2011) and Vão dos Bois farm (9 spp., Bonvicino et al. 2002), in northeastern Goiás state. Besides the relevant richness present in conservation units, endemic and rare species were also recorded in regions affected by hydroelectric reservoirs, where it was observed a high diversity loss due to landscape flooding (e.g., Carmignotto 2019), highlighting the real need for strategic efforts to conserve rodent communities of Goiás state.

## 10.3. Potential rodent species in Goiás state

Among potential species which could occur in the state, we speculate that in the central region of Goiás it is possible to find records of *Akodon lindberghi*, *Gyldenstolpia planaltensis*, *Thalpomys lasiotis* and *Phyllomys centralis*. These species have been recorded in Federal District of Brazil, which is within Goiás state, and neighboring federative unities such as Mato Grosso and Minas Gerais states (Andrade et al. 2004; Ribeiro & Marinho-Filho 2005; Bezerra 2011; Machado et al. 2018).

## Conclusions

Goiás state harbors a rich mammalian fauna, especially for bats, rodents, carnivores, and marsupials. Regardless of state geographical size, the number of species listed for Goiás is higher than the listed for other Brazilian states, except for Mato Grosso and São Paulo. The mammalian fauna of Goiás is characterized by inhabitants of open (e.g. Cerrado and Caatinga) and forested environments (e.g., Amazon and Atlantic Forest), due to the presence of a vegetation mosaic in the Cerrado domain. Gallery forests and semideciduous forests contribute to mammal richness in central Brazil, and habitat selectivity seems to be more evident for small mammals. Medium and large-sized mammals tend to be more generalists in terms of habitat and are widely distributed across Goiás state.

Another pattern found here is that the studies reporting largest numbers of mammal species for Goiás state were carried out in conservation units, and some species have been found only inside these protected areas. Thus, we highlight the need to increment the number of conservation units in the state, especially regarding the central and southeastern portion of Goiás, which was once represented by a large area part of Alto Paraná Atlantic Forest ecoregion, but now is represented by few, scattered and small remnants, with no conservation units (Giustina et al. 2018). We also conclude that there are still great portions of the state lacking a proper mammal survey. There is scant and fragmented information about mammals based on specimens housed in scientific collections, especially from the northwestern portion of Goiás. Thus, the increase in the number of inventories in the state, including complementary survey techniques (see Srbek-Araujo & Chiarello 2004; Bovendorp et al. 2017; Arias-Aguilar et al. 2018), and the collection of vouchers and tissue samples to provide correct species delimitation and identification, will allow a better understanding on the biodiversity and conservation of mammals in Goiás state.

## Acknowledgments

The curators and curator assistants Robert S. Voss (AMNH), João A. Oliveira and Stella M. Franco (MN/UFRJ), Mario de Vivo and Juliana Gualda (MZUSP), Bárbara Costa (UFMG), Pedro Cordeiro-Estrela (UFPA), Jader Marinho-Filho and Pedro de Podestà (UnB and CMVUNB). MZ, AMC and DAS thanks Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq and Fundação de Amparo à Pesquisa do Estado de Goiás - FAPEG within the scope of the Jataí PELD project (Process # 15/2017-10267000329) and to D. Sampaio, for confirming a record. ARB received research fellowships from CNPq [BJT 372459/2013-7, DCR 300461/2016-0, PCI-DA300670/2019-2]; APC thanks Fundação de Amparo à Pesquisa do Estado de São Paulo - FAPESP (Processes ##00/06642-4, #2011/20022-3); CRB granted a project CNPq (BJT 402176/2012-0) and research grants [CNPq 304498/2014 and Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro - FAPERJ E26/2014].

## Supplementary Material

The following online material is available for this article:

Table S1. Literature data with records of mammal species for Goiás state, central Brazil.

Figure S1. Visual observation of *Tolypeutes tricinctus* in Mambáí, Goiás.

## Author Contributions

Wellington Hannibal: Substantial contribution in the concept and design of the study. Contribution to critical revision, adding intellectual content.

Marlon Zortéa: Contribution to data collection and manuscript preparation – Bats; Contribution to critical revision, adding intellectual content.

Analice M. Calaça: Contribution to data collection and manuscript preparation - Medium and large-sized mammals, Contribution to critical revision, adding intellectual content.

Ana Paula Carmignotto: Contribution to data collection and manuscript preparation - Non-volant small mammals, Contribution to critical revision, adding intellectual content.

Alexandra M. R. Bezerra: Contribution to data collection and manuscript preparation - Non-volant small mammals, Contribution to critical revision, adding intellectual content.

Henrique G. Carvalho: Contribution to data collection and manuscript preparation – Bats;

Cibele R. Bonvicino: Contribution to data collection and manuscript preparation - Non-volant small mammals, Contribution to critical revision, adding intellectual content.

Ana C. M. Martins: Contribution to data collection and manuscript preparation – Bats; Contribution to critical revision, adding intellectual content.

Ludmilla M. S. Aguiar: Contribution to data collection and manuscript preparation – Bats;

Marcelino B. de Souza: Contribution to data collection and manuscript preparation – Bats;

Ingrid de Mattos: Contribution to data collection and manuscript preparation – Bats; Contribution to critical revision, adding intellectual content.

Roniel F. Oliveira: Contribution to data collection and manuscript preparation - Medium and large-sized mammals; Contribution to critical revision, adding intellectual content.

Daniel Brito: Contribution to data collection and manuscript preparation – Bats;

Diego A. Silva: Contribution to data collection and manuscript preparation - Medium and large-sized mammals;

Marco A. Guimarães: Contribution to data collection and manuscript preparation - Medium and large-sized mammals;

Ewilson M. B. do Carmo: Contribution to data collection and manuscript preparation – Bats;

Jânio C. Moreira: Contribution to data collection and manuscript preparation - Medium and large-sized mammals;

All authors reviewed the manuscript and gave final approval for publication.

## Conflicts of Interest

The authors declare that they have no conflict of interest related to the publication of this manuscript.

## References

ABREU, E.F., CASALI, D.M., GARBINO, G.S.T., LORETTO, D., LOSS, A.C., MARMONTEL, M., NASCIMENTO, M.C., OLIVEIRA, M.L., PAVAN, S.E. & TIRELLI, F.P. 2020. Lista de Mamíferos do Brasil. Comitê de Taxonomia da Sociedade Brasileira de Mastozoologia (CT-SBMZ). <<https://www.sbmz.org/mamiferos-do-brasil>> (28 August 2020).



- ACOSTA, L.E., GARBINO, G.S.T., GASPARINI, G.M. & DUTRA, R.P. 2020. Unraveling the nomenclatural puzzle of the collared and white-lipped peccaries (Mammalia, Certartiodactyla, Tayassuidae). *Zootaxa* 4851(1):60-80. <https://doi.org/10.11646/zootaxa.4851.1.2>
- AGUIAR, L.M.S., BRITO, D. & MACHADO, R. B. 2010. Do current vampire bat (*Desmodus rotundus*) population control practices pose a threat to Dekeyser's Nectar Bat's (*Lonchophylla dekeyseri*) long-term persistence in the Cerrado? *Acta Chiropterologica* 12(2): 275-282.
- AGUIAR, L. 2016. *Lonchophylla bokermanni*. The IUCN Red List of Threatened Species 2016. <<https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T12263A22038287.en>> (1 July 2020).
- AGUIAR, L. & BERNARD, E. 2016. *Lonchophylla dekeyseri*. The IUCN Red List of Threatened Species 2016. <<https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T12263A22038287.en>> (1 July 2020).
- AGUIAR, L.M.S., BERNARD, E., RIBEIRO, V., MACHADO, R.B. & JONES, G. 2016. Should I stay or should I go? Climate change effects on the future of Neotropical savannah bats. *Global Ecol. Conserv.* 5:22-33.
- AGUIAR, L.M.S., PEREIRA, M.J.R., ZORTÉA, M. & MACHADO, R.B. 2020. Where are the bats? An environmental complementarity analysis in a megadiverse country. *Divers. Distrib.* 2020;00:1-13. DOI: 10.1111/ddi.13137
- ANACLETO, T.C.S., DINIZ-FILHO, J.A.F. & VITAL, M.V.C. 2006. Estimating potential geographic ranges of armadillos (*Xenarthra*, Dasypodidae) in Brazil under niche-based models. *Mammalia* 70:202-213.
- ANACLETO, T.C.S. & MARINHO-FILHO, J. 2001. Hábito alimentar do tatu-canastra (*Xenarthra*, Dasypodidae) em uma área de cerrado do Brasil Central. *Rev. Bras. Zool.* 18:681-688.
- ANDRADE, A.F.B., BONVICINO, C.R., BRIANI, D.C. & KASAHARA, S. 2004. Karyologic diversification and phylogenetics relationships of the genus *Thalpomys* (Rodentia, Sigmodontinae). *Acta Theriol.* 49(2):181-190.
- ANDRADES-MIRANDA, J., ZANCHIN, N.I.T., OLIVEIRA, L.F.B., LANGGUTH, A.R. & MATTEVI, M.S. 2000. Cytogenetic studies in nine taxa of the genus *Oryzomys* (Rodentia, Sigmodontinae) from Brazil. *Mammalia* 65(4): 461-472.
- ARIAS-AGUILAR, A., HINTZE, F., AGUIAR, L.M.S., RUFRAJ, V., BERNARD, E. & PEREIRA, M.J.R. 2018. Who's calling? Acoustic identification of Brazilian bats. *Mammal Res.* 63:231-253.
- BAYAT, S., GEISER, F., KRISTIANSEN, P. & WILSON, S.C. 2014. Organic contaminants in bats: trends and new issues. *Environ. Int.* 63:40-52.
- BEISIEGEL, B.M. 2017. Cumulative environmental impacts and extinction risk of Brazilian carnivores. *Oecol. Aust.* 21:350-360.
- BERNARD, E., AGUIAR, L.M.S. & MACHADO, R.B. 2011. Discovering the Brazilian bat fauna: a task for two centuries? *Mammal Rev.* 41:23-39.
- BERNARDO, P.V.S. & MELO, F.R. 2013. Assemblage of medium and large size mammals in an urban Semideciduous Seasonal Forest fragment in Cerrado biome. *Biota Neotrop.* 13:76-80. <http://www.biotaneotropica.org.br/v13n2/pt/abstract?article+bn02813022013>
- BEZERRA, A.M.R. 2008. Revisão taxonômica do gênero *Galea* Meyen, 1832 (Rodentia, Caviidae, Caviinae). Tese de Doutorado, Universidade de Brasília, Brasília.
- BEZERRA, A.M.R. 2011. Collection records of *Gyldenstolpia planaltensis* (Avila-Pires 1972) suggest the local extinction of the species. *Mastozool.* 18:119-123.
- BEZERRA, A.M.R., BONVICINO, C.R., MENEZES, A.A.N. & MARINHO FILHO, J. 2010. Endemic climbing cavy *Kerodon acrobata* (Rodentia: Caviidae: Hydrochoerinae) from dry forest patches in the Cerrado domain: new data on distribution, natural history, and morphology. *Zootaxa* 2724:29-36.
- BEZERRA, A.M.R., CASTIGLIA, R., PEREIRA, L.G., MOREIRA, J.C. & BONVICINO, C.R. 2020. Molecular systematics of the genus *Necomys* (Rodentia: Cricetidae: Sigmodontinae) reveals two cryptic and syntopic species in western Cerrado of Brazil. *Zool. Anz.* 285:147-158. <https://doi.org/10.1016/j.jcz.2020.02.007>
- BEZERRA, A.M.R. & MARINHO-FILHO, J.S. 2007. Bats of the Paranã River Valley, Tocantins and Goiás states, Central Brazil. *Zootaxa* 2725: 41-56.
- BEZERRA, A.M.R., MARINHO-FILHO, J. & CARMIGNOTTO, A.P. 2011. A review of the distribution, morphology, and habit of the Owl's Spiny Rat *Carterodon sulcidens* (Lund, 1841) (Rodentia: Echimyidae). *Zool. Stud.* 50:566-576.
- BEZERRA, A.M.R. & OLIVEIRA, J.A. 2010. Taxonomic implications of cranial morphometric variation in the genus *Clyomys* Thomas 1916 (Rodentia: Echimyidae). *J. Mammal.* 91:260-272.
- BEZERRA, A.M.R., DA SILVA JR, N.J. & MARINHO-FILHO, J. 2007. *Dactylomys dactylinus* (Rodentia: Echimyidae) in Cerrado of Central Brazil and the role of gallery forests in its distribution. *Biota Neotrop.* 7:235-237. <http://www.biotaneotropica.org.br/v7n1/pt/abstract?short-communication+bn03507012007>
- BDTD. 2020. Biblioteca Brasileira de Teses e Dissertações. Disponível em: <<http://bdtd.ibict.br/vufind/>>. Acessado em: 10 jan. 2020.
- BIANCONI, G.V. & PEDRO, W.A. 2017. Subfamília Vespertilioninae Gray, 1821. In *História Natural dos Morcegos Brasileiros – Chave de Identificação de Espécies* (N.R.Reis, A.L. Peracchi, C.B. Batista, I.P. Lima & A.D. Pereira, eds.). Editora Technical Books, Rio de Janeiro, p.321-351
- BICHUETTE, M.E., GIMENEZ, E.A. ARNONE, I.S. & TRAJANO, E. 2018. An important site for conservation of bats in Brazil: Passa Três cave, São Domingos karst area, with an updated checklist for Distrito Federal (DF) and Goiás state. *Subterr. Biol.* 28:39-51.
- BOCCHIGLIERI, A., MENDONÇA, A.F. & HENRIQUES, R.P.B. 2010. Composição e diversidade de mamíferos de médio e grande porte no Cerrado do Brasil central. *Biota Neotrop.* 10:169-176. <http://www.biotaneotropica.org.br/v10n3/en/abstract?article+bn03110032010>.
- BONVICINO, C.R., CASADO, F. & WEKSLER, M. 2014. A new species of *Cerradomys* (Mammalia: Rodentia: Cricetidae) from Central Brazil, with remarks on the taxonomy of the genus. *Zoologia* 31:525-540.
- BONVICINO C.R., LAZAR, A., FREITAS, T., LANES, R.O. & D'ANDREA, P.S. 2021. Diversification of the Marsupials (*Didelphimorphia*) of South America. In *New World marsupials: an evolutionary, biogeographical, and ecological approach* (N.C. Cáceres, ed). Springer Nature, Cham, p. 000-000.
- BONVICINO, C.R., LEMOS, B. & WEKSLER, M. 2005. Small mammals of Chapada dos Veadeiros National Park (Cerrado of central Brazil): ecologic, karyologic, and taxonomic considerations. *Braz. J. Biol.* 65(3): 395-406.
- BONVICINO, C.R., LINDBERGH, S.M. & MAROJA, L.S. 2002. Small non-flying mammals from conserved and altered areas of Atlantic forest and Cerrado: comments on their potential use for monitoring environment. *Braz. J. Biol.* 62:765-774.
- BONVICINO, C.R., MENEZES, A.N., LAZAR, A., PENNA-FIRME, V., BUENO, C., VIANA, M.C., D'ANDREA, P. S. & LANGGUTH, A. 2015. Chromosomes and phylogeography of *Sylvilagus* (MAMMALIA: LEPORIDAE) from eastern Brazil. *Oeco. Austr.* 19(1): 158-172.
- BONVICINO, C.R., PENNA-FIRME, V. TEIXEIRA, B.R. & CARAMASCHI, F.P. 2011. Pequenos mamíferos não voadores (Rodentia, Didelphimorphia) de uma localidade do Cerrado do estado de Goiás. *Bol. Soc. Bras. Mastozool.* 61:8-14.
- BONVICINO, C.R., SOARES, V.A., SAMPAIO, R.C. & BEZERRA, A.M.R. 2020. Guia dos mamíferos não voadores do Jardim Botânico de Brasília, DF, Brasil. *Heringeriana*, série Biodiversidades.
- BORGES, L.H.M., CALOURO, A.M. BOTELHO, A.L.M. & SILVEIRA, M. 2014. Diversity and habitat preference of medium and large-sized mammals in an urban forest fragment of southwestern Amazon. *Iheringia - Ser. Zool.* 104:168-174.
- BOVENDORP, R.S., MCCLEERY, R.A. & GALETTI, M. 2017. Optimising sampling methods for small mammal communities in Neotropical rainforests. *Mammal Rev.* 47:148-158.
- BRANDÃO, M.V. GARBINO, G.S.T., SEMEDO, T.B.F., FEIJÓ, A., NASCIMENTO, F.O., FERNANDES-FERREIRA, H., ROSSI, R.V., DALPONTE, J. & CARMIGNOTTO, A.P. 2019. Mammals of Mato Grosso, Brazil: Annotated species list and historical review. *Mastozool. Neotrop.* 26:263-307.
- BURGIN, C.J., COLELLA, J.P. KAHN, P.L. & UPHAM, N.S. 2018. How many species of mammals are there? *J. Mammal.* 99:1-14.
- BURGIN, C.J., COLELLA, J.P. KAHN, P.L. & UPHAM, N.S. 2019. Corrigendum: How many species of mammals are there? *J. Mammal.* 100:615.
- CABRAL, R., ZANIN, M. PORFÍRIO, G. & BRITO, D. 2017. Medium-sized to large mammals of Serra do Tombador, Cerrado of Brazil. *Check List* 13:1-6.

- CÁCERES, N.C., CARMIGNOTTO, A.P. FISCHER, E. & SANTOS, C.F. 2008. Mammals from Mato Grosso do Sul, Brazil. Check List 4:321.
- CÁCERES, N.C., CASELLA, J., VARGAS, C.F., PRATES, L.Z., TOMBINI, A.A.M., GOULART, C.S. & LOPES, W.H. 2008. Distribuição geográfica de pequenos mamíferos não voadores nas bacias dos rios Araguaia e Paraná, região centro-sul do Brasil. *Iheringia, Sér. Zool.*, 98 (2): 173-180.
- CALAÇA, A., FACHI, M. SILVA, D.A. OLIVEIRA, S.R. & MELO, F.R. 2018. Mammals recorded in isolated remnants of Atlantic Forest in southern Goiás, Brazil. *Biota Neotrop.* 19:e20180575. <http://dx.doi.org/10.1590/1676-0611-BN-2018-0575>
- CARDOSO, M.R.D., & MARCUZZO, F.F.N. 2014. Classificação climática de Köppen-Geiger para o estado de Goiás e o Distrito Federal. *ACTA Geográfica* 8 (16): 40-55.
- CARLETON, M.D. & MUSSER, G.G. 2015. Genus *Oecomys* Thomas, 1906. In *Mammals of South America, Vol 2, Rodents* (J.L. Patton, U.F.J. Pardiñas & G. D'Elia, eds.). The University of Chicago Press, Chicago and London, p.393-416.
- CARMIGNOTTO, A.P. 2005. Pequenos mamíferos terrestres do bioma Cerrado: padrões faunísticos locais e regionais. Tese de Doutorado, Universidade de São Paulo, São Paulo.
- CARMIGNOTTO, A.P. 2019. Effects of damming on a small mammal assemblage in Central Brazil Cerrado. *Bol. Soc. Bras. Mastozool.* 85:63–73.
- CARMIGNOTTO, A.P. & ASTUA DE MORAES, D. 2016. *Thylamys velutinus*. The IUCN Red List of Threatened Species 2016: e.T40520A22172367. <https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T40520A22172367.en>. Downloaded on 07 March 2021. Carvalho et al. 2002
- CARMIGNOTTO, A.P., BEZERRA, A.M.R. & RODRIGUES, F.H.G. 2014. Nonvolant small mammals from a southwestern area of Brazilian Cerrado: diversity, habitat use, seasonality, and biogeography. *Therya* 5:535–558.
- CARMIGNOTTO, A.P., VIVO, M. & LANGGUTH, A. 2012. Mammals of the Cerrado and Caatinga: distribution patterns of the tropical open biomes of Central South America. In *Bones, Clones, and Biomes: The History and Geography of Recent Neotropical Mammals* (B.D. Patterson & L.P. Costa, eds.). University of Chicago, Chicago, p.307–350
- CARTER, D.C. & DOLAN, P.G. 1978. Catalogue of type specimens of Neotropical bats in selected European museums. Special publications. Texas Tech University Press. 136 p.
- CARTER, T.S., SUPERINA, M. & LESLIE, D.M. 2016. *Priodontes maximus* (Cingulata: Chlamyphoridae). *Mamm. Species* 48:21–34.
- CARVALHO, B.D.A., OLIVEIRA, L.F.B. NUNES, A.P. & MATTEVI, M.S. 2002. Karyotypes of nineteen marsupial species from Brazil. *J. Mammal.* 83:58–70.
- CATZEFELIS, F., PATTON J., PERCEQUILLO, A., & WEKSLER, M. 2016. *Dasyprocta azarae*. The IUCN Red List of Threatened Species 2016: e.T6278A22198654. <https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T6278A22198654.en>. Downloaded on 08 March 2021.
- CHEREM, J., SIMÕES-LOPES, P. ALTHOFF, S.L. & GRAIPEL, M.E. 2004. Lista dos mamíferos do estado de Santa Catarina, sul do Brasil. *Mastozool. Neotrop.* 11:151–184.
- COIMBRA, C.E.A.J., BORGES, M.M. GUERRA, D.Q. & MELLO, D.A. 1982. Contribuição à zoogeografia e ecologia de morcegos em regiões de cerrado do Brasil central. *Bol. Téc. Rev. Brasil Floresta* 7:33–38.
- COSTA, B.M.A., GEISE, L. PEREIRA, L.G. & COSTA, L.P. 2011. Phylogeography of *Rhipidomys* (Rodentia: Cricetidae: Sigmodontinae) and description of two new species from southeastern Brazil. *J. Mammal.* 92:945–962.
- COSTA, L.P. 2001. Phylogeographic studies on neotropical small mammals. PhD Dissertation. University of Califórnia, Berkeley.
- COSTA, L.P. 2003. The historical bridge between the Amazon and the forest of Brazil a study of molecular phylogeography with small mammals. *J. Biogeogr.* 30:71–86.
- COSTA, L.P., LEITE, Y.L.R. & PATTON, J.L. 2003. Phylogeography and systematic notes on two species of gracile mouse opossums, genus *Gracilinanus* (Marsupialia: Didelphidae) from Brazil. *P. Biol. Soc. Wash.* 116(2):275-292.
- D'ELÍA, G., FABRE, P.-H. & LESSA, E. 2019. Rodent systematics in an age of discovery: recent advances and prospects. *J. Mammal.* 100:852–871.
- DE LA SANCHA, N.U. & D'ELÍA, G. 2014. Additions to the Paraguayan mammal fauna: the first records of two marsupials (Didelphimorphia, Didelphidae) with comments on the alpha taxonomy of *Cryptonanus* and *Philander*. *Mammalia* 79(3):343-356.
- DELGADO-JARAMILLO, M., AGUIAR, L. M. MACHADO, R. B. & BERNARD, E. 2020. Assessing the distribution of a species-rich group in a continental-sized megadiverse country: Bats in Brazil. *Divers. Distrib.* 26(5):632-643. DOI: 10.1111/ddi.13043
- DESBIEZ, A.L.J. ET AL. 2012. Avaliação do Risco de Extinção do Cateto Pecari tajacu Linnaeus, 1758, no Brasil. *Biodiver. Bras.* 1:74–83.
- DESBIEZ, A.L.J. & MEDRI, I.M. 2010. Density and habitat use by giant anteaters (*Myrmecophaga tridactyla*) and southern tamanduas (*Tamandua tetradactyla*) in the Pantanal wetland, Brazil. *Edentata* 11:4–10.
- DIAS, D.M., ALMEIDA, M.O.S., ARAÚJO-PIOVEZAN, T.G. & DANTAS, J.O. 2019. Spatiotemporal ecology of two Neotropical herbivorous mammals. *Pap. Avulsos de Zool. (São Paulo)* 59:e20195910.
- DIAS, D. & OLIVEIRA, M.B. 2020. First record of *Xeronycteris vieirai* Gregorin & Ditchfield, 2005 (Chiroptera, Phyllostomidae) for the Cerrado biome. *Oecol. Aust.* 24:696–703.
- DINERSTEIN, E. ET AL. 2017. An Ecoregion-Based Approach to Protecting Half the Terrestrial Realm. *BioScience* 67:534–545.
- DUARTE, J.M.B. ET AL. 2012a. Avaliação do Risco de Extinção do Veado-mateiro *Mazama americana* Erxleben, 1777, no Brasil. *Biodivers. Bras.* 33–41.
- DUARTE, J.M.B. ET AL. 2012b. Avaliação do Risco de Extinção do Veado-catingueiro *Mazama gouazoubira* G. Fischer, 1814, no Brasil. *Biodivers. Bras.* 50–58.
- DUARTE, J.M.B. ET AL. 2012c. Avaliação do Risco de Extinção do Veado-campeiro *Ozotoceros bezoarticus* Linnaeus, 1758, no Brasil. *Biodivers. Bras.* 20–32.
- DUARTE, J.M.B. ET AL. 2012d. Avaliação do Risco de Extinção do Cervo-dopantanal. *Blastocerus dichotomus* Illiger, 1815, no Brasil. *Biodivers. Bras.* 3–11.
- DUARTE, J.M.B. ET AL. 2018. *Blastocerus dichotomus* (Illiger, 1815). Livro vermelho da fauna brasileira ameaçada de extinção (ICMBio/MMA, ed.). Instituto Chico Mendes de Conservação da Biodiversidade, Brasília.
- DUARTE, J.M.B. & GONZALEZ, S. 2010. Neotropical Cervidology, Biology and Medicine of Latin American Deer. *Funep/IUCN*.
- DUARTE, J.M.B. & VOGLIOTTI, A. 2016. *Mazama americana*. The IUCN Red List of Threatened Species 2016: e.T29619A22154827. <https://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T29619A22154827.en>. Downloaded on 07 March 2021.
- DUNNUM, J.L. 2015. Family Caviidae G. Fischer, 1817. In *Mammals of South America, Vol 2, Rodents* (J.L. Patton, U.F.J. Pardiñas & G. D'Elia, eds.). The University of Chicago Press, Chicago and London, p.690-725.
- EGER, J.L. 1977. Systematics of the Genus *Eumops* (Chiroptera: Molossidae). *Life Sci. Contribution* 110:1–69.
- EITEN, G. 1972. The cerrado vegetation of Brazil. *Bot. Rev.* 38:201–341.
- EMMONS, L. & FEER, F. 1997. Neotropical Rainforest Mammals. A Field Guide. 2nd edition. The University of Chicago Press, Chicago.
- FEGIES, A.C., CARMIGNOTTO, A.P., PEREZ, M.F., GUILARDI, M.D. & LESSINGER, A.C. In press. Molecular Phylogeny of *Cryptonanus* (Didelphidae: Thylamyini): evidence for a recent and complex diversification in South American open biomes. *Mol. Phylogenet. Evol.* YMPPEV 107213.
- FEIJÓ, A., GARBINO, G.S.T., CAMPOS, B.A.T.P., ROCHA, P.A., FERRARI, S.F. & LANGGUTH, A. 2015. Distribution of *Tolypeutes* Illiger, 1811 (*Xenarthra*: Cingulata) with comments on its biogeography and conservation. *Zool. Sci.* 32:77–87.
- FEIJÓ, A. & LANGGUTH, A. 2013. Mamíferos de Médio e Grande Porte do Nordeste do Brasil: Distribuição e Taxonomia, com Descrição de Novas Espécies. *Rev. Nordest. Biol.* 22 (1/2):3-225.
- FEIJÓ, A., PATTERSON, B.D. & CORDEIRO-ESTRELA, P. 2018. Taxonomic revision of the long-nosed armadillos, Genus *Dasybus* Linnaeus, 1758 (Mammalia, Cingulata). *PLoS ONE* 13(4): e0195084.
- FERREGUETTI, A.C., LESSA, I.C.M., VIEIRA, E.M., CUNHA, A.A. & BERGALLO, H.G. 2019. Medium- and large-sized mammal composition in the Chapada dos Veadeiros National Park and adjacent areas, state of Goiás, Brazil. *Pap. Avulsos Zool.* 59:e20195942.

- FERREIRA, G.B. ET AL. 2020. Strict protected areas are essential for the conservation of larger and threatened mammals in a priority region of the Brazilian Cerrado. *Biol. Conserv.* 251:108762.
- FRACASSO, M.P.A. & SALLES, L.O. 2005. Diversity of Quaternary Bats from Serra da Mesa (State of Goiás, Brazil). *Zootaxa* 817:1–19.
- GARBINO, G.S.T., GREGORIN, R., LIMA, I.P., LOUREIRO, L., MORAS, L.M., MORATELLI, R., NOGUEIRA, M.R., PAVAN, A.C., TAVARES, V.C., do NASCIMENTO, M.C. & PERACCHI, A.L. 2020. Updated checklist of Brazilian bats: versão 2020. Comitê da Lista de Morcegos do Brasil—CLMB. Sociedade Brasileira para o Estudo de Quirópteros (Sbeq).
- GARDNER, A.L. 2008. Mammals of South America, vol 1. Marsupials, Xenarthrans, Shrews, and Bats. 1st edition. The University of Chicago Press, Chicago.
- GARDNER, A.L. 2008. Genus *Cryptonanus*. In *Mammals of South America, Vol 1. Marsupials, Xenarthrans, Shrews, and Bats.* (A.L. Gardner, ed.). The University of Chicago Press, Chicago. p.40–43.
- GEOFFROY ST.-HILAIRE, I. 1984. Sur les vespertillons du Brésil. *Annales des Sciences Naturelles.* Paris 3:440–447.
- GIOZZA, A.T., JÁCOMO D. A., SILVEIRA, L. & TORRES, N.M. 2017. Abundância relativa de mamíferos de médio e grande porte na região do Parque Nacional das EmasGO. *Rev. Bras. Zoociências* 18 (3): 71–87.
- GIUSTINA, C.C.D., SILVA, S.D. & MARTINS, E.S. 2018. Geographic reconstruction of a Central-West Brazilian landscape devastated during the first half of the 20th century: Mato Grosso de Goiás. *Sustentabilidade em Debate* 9:44–63.
- GOMES, L.P., ROCHA, C.R. BRANDÃO, R.A. & MARINHO-FILHO, J. 2015. Mammal richness and diversity in Serra do Facão region, Southeastern Goiás state, central Brazil. *Biota Neotrop.* 15:1–11. <https://doi.org/10.1590/1676-0611-BN-2015-0033>
- GONÇALVES, P.R. & OLIVEIRA, J. 2014. An integrative appraisal of the diversification in the Atlantic forest genus *Delomys* (Rodentia: Cricetidae: Sigmodontinae) with the description of a new species. *Zootaxa* 3760 (1):1–38. <http://dx.doi.org/10.11646/zootaxa.3760.1.1>
- GONZÁLEZ, S. ET AL. 2010. Pampas deer *Ozotoceros bezoarticus* Linnaeus 1758. In *Neotropical Cervidology, Biology and Medicine of Latin American Deer* (J.M.B. Duarte & S. Gonzalez, eds.). Funep/IUCN, p.119–132
- GONZÁLEZ, S., JACKSON, III, J.J. & MERINO, M.L. 2016. *Ozotoceros bezoarticus*. The IUCN Red List of Threatened Species 2016: e.T15803A22160030. <https://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T15803A22160030.en>. Downloaded on 07 March 2021.
- GRANDE, T.O., ALENCAR, R.M., RIBEIRO, P.P. & MELO, F.R. 2020. Fragment shape and size, landscape permeability and fragmentation level as predictors of primate occupancy in a region of Brazilian Cerrado. *Acta Sci.* 42:e48339.
- GUSMÃO, A.C., OLIVEIRA, R.F., SILVA, O.D., MELO, F.R. & SANTOS-FILHO, S. 2018. An extension of the known geographic distribution of *Sapajus cay* (Illiger, 1815) (Primates, Cebidae) in southwestern Brazilian Amazonia. *Check List* 14:11–14.
- GUTIÉRREZ, E.E., & MARINHO-FILHO, J. 2017. The mammalian faunas endemic to the Cerrado and the Caatinga. *ZooKeys* 2017:105–157.
- HANNIBAL, W., DA CUNHA, N.L., DALPONTI, G., OLIVEIRA, S.R. & PEREIRA, K.R.F. 2018. Roadkill and new records for giant armadillo (*Prionomys maximus*) in central-western Brazil. *Mastozoology. Neotrop.* 25:229–234.
- HINTZE, F., ARIAS-AGUILAR, A., DIAS-SILVA, L., DELGADO-JARAMILLO, M., SILVA, C.R., JUCÁ, T., MISCHIATTI, F.L., ALMEIDA, M., BEZERRA, B., AGUIAR, L.M.S., RAMOS PEREIRA, M.J. & BERNARD, E. 2020. Molossid unlimited: extraordinary extension of range and unusual vocalization patterns of the bat, *Promops centralis*. *J. Mammal.* 101(2): 417–432.
- HOPE, J.P., MARCHEZI, G. & DITCHFIELD, A.D. 2019. First record of the White-winged Vampire bat, *Diaemus youngii* (Jentink, 1893) (Chiroptera, Phyllostomidae) for the state of Goiás, Brazil, with a revised distribution map. *Check List* 15:55–64.
- HRBEK, T., DA SILVA, V.M.F., DUTRA, N., GRAVENA, W., MARTIN, A.R. & FARIAS, I.P. 2014. A new species of river dolphin from Brazil or how little do we know our biodiversity. *PLoS ONE* 9:e83623.
- IBGE. 2011. Instituto Brasileiro de Geografia e Estatística. Mapa de Vegetação da Folha SD 22. IBGE. <[http://servicodados.ibge.gov.br/download.ashx?u=geofp.ibge.gov.br/mapeamento\\_sistemico/banco\\_de\\_dados\\_georreferenciado\\_recursos\\_naturais/latlong/sd\\_22/vegetacao.zip](http://servicodados.ibge.gov.br/download.ashx?u=geofp.ibge.gov.br/mapeamento_sistemico/banco_de_dados_georreferenciado_recursos_naturais/latlong/sd_22/vegetacao.zip)>.
- ICMBio/MMA. 2018. Livro Vermelho da Fauna Brasileira Ameaçada de Extinção, Volume II - Mamíferos. 1. ed. Instituto Chico Mendes de Conservação da Biodiversidade, Brasília.
- IMB. 2020. Instituto Mauro Borges de Estatística e Estudos Socioeconômicos. 2016. IMB. <<https://www.imb.go.gov.br/sobre-goias.html>> (7 June 2020).
- IUCN. 2020. The IUCN Red List of Threatened Species. IUCN. <<https://www.iucnredlist.org/amazing-species>> (1 October 2020).
- JERUSALINSKY, L. & MELO, F.R. 2018. Conservação de primatas no Brasil: perspectivas e desafios. In *La primatologia en Latinoamérica 2 – A primatologia na America Latina 2.* Tomo I Argentina/Colombia (B. Urbani, M. Kowalewski, R.G.T. Cunha, S. De La Torre & L. Cortés-Ortiz, eds.). Instituto Venezolano de Investigaciones Científicas (IVIC), Caracas, p.161–186
- JUAREZ, K.M. & MARINHO-FILHO, J. 2002. Diet, habitat use, and home ranges of sympatric canids in central Brazil. *J. Mammal.* 83:925–933.
- KEUROGHILIAN, A. ET AL. 2012. Avaliação do Risco de Extinção do Queixada *Tayassu pecari* Link, 1795, no Brasil. *Biodivers. Bras.* 1:84–102.
- KEUROGHILIAN, A. ET AL. 2018. *Tayassu pecari* (Link, 1795). In Livro vermelho da fauna brasileira ameaçada de extinção (ICMBio/MMA, ed.). Instituto Chico Mendes de Conservação da Biodiversidade, Brasília, p.88–98
- KLINK, C.A. & MACHADO, R.B. 2005. Conservation of the Brazilian Cerrado. *Conserv. Biol.* 19:707–713.
- LANES, R. 2020. Análise Filogenética e Citogenética do gênero *Rhipidomys* Tschudi, 1845 (Rodentia, Cricetidae). Universidade Federal do Rio de Janeiro.
- LEMOS, F.G., COSTA, A.N., AZEVEDO, F.C., FRAGOSO, C.E., FREITAS, M.C. & ROCHA, E.C. 2020. Surveying in highly-modified landscapes to document the occurrence of threatened species: A study of the giant armadillo *Prionomys maximus* in central Brazil. *Oryx* 54:133–139.
- LEUCHTENBERGER, C., OLIVEIRA-SANTOS, L.G., MAGNUSSON, W. & MOURÃO, G. 2013. Space use by giant otter groups in the Brazilian Pantanal. *J. Mammal.* 94:320–330.
- LIMA, E.S., JORGE, M.L.S.P., JORGE, R.S.P. & MORATO, R.G. 2014. The bush dog *Speothos venatus*: area requirement and habitat use in cultivated lands. *Oryx* 49(1):64–70.
- MACHADO, L.F., LOSS, A.C., PAZ, A., VIEIRA, E.M., RODRIGUES, F.P. & MARINHO-FILHO, J. 2018. Phylogeny and biogeography of *Phyllomys* (Rodentia, Echimyidae) reveal a new species from the Cerrado, and suggest Miocene connections of the Amazon and Atlantic Forest. *J. Mammal.* 99:377–396.
- MARINHO-FILHO, J., GUIMARÃES, M.M., REIS, M.L., RODRIGUES, F.H.G., TORRES, O. & ALMEIDA, G. 1997. The discovery of the Brazilian three banded armadillo in the Cerrado of Central Brazil. *Edentata* 3:11–13.
- MARINHO-FILHO, J., RODRIGUES, F. & JUAREZ, K. 2002. The Cerrado mammals: diversity, ecology and natural history. In *The Cerrados of Brazil. Ecology and natural history of a Neotropical savanna* (P.S. Oliveira & R.J. Marquis, eds). Columbia University Press, New York, p.266–284
- MARINHO-FILHO, J. & GUIMARÃES, M.M. 2010. Comportamento sexual de tatu-bola (*Tolypeutes tricinctus*, Dasypodidae). *Edentata* 11:76–77.
- MARTÍNEZ-LANFRANCO, J.A., FLORES, D., JAYAT, J.P. & D'ELÍA, G. 2014. A new species of lutrine opossum, genus *Lutreolina* Thomas (Didelphidae), from the South American Yungas. *J. Mammal.* 95(2):225–240.
- MEDICI, E.P. ET AL. 2012. Avaliação do risco de extinção da anta brasileira *Tapirus terrestris* Linnaeus, 1758, no Brasil. *Biodivers. Bras.* 1:103–116.
- MEDICI, E.P. ET AL. 2018. *Tapirus terrestris* (Linnaeus, 1758). In Livro Vermelho da Fauna Brasileira Ameaçada de Extinção - Volume II - Mamíferos (ICMBio/MMA, ed.). 2a. MMA, Brasília, p.59–67.
- MIGUEL, P.H., KERCHES-ROGERI, P., NIEBUHR, B.B., CRUZ, R.A.S., RIBEIRO, M.C. & CRUZ-NETO A.P. 2019. Habitat amount partially affects physiological condition and stress level in Neotropical fruit-eating bats. *Comp. Biochem. Physiol. Part A Mol. Integr. Physiol.* 237:110537.



- MIRANDA, F., BERTASSONI, A. & ABBA, A.M. 2014a. Myrmecophaga tridactyla. The IUCN Red List of Threatened Species. The IUCN Red List of Threatened Species. <<https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T14224A47441961.en>> (7 June 2020).
- MIRANDA, F., FALLABRINO, A., ARTEAGA, M., TIRIRA, D.G., MERITT, D.A. & SUPERINA, M. 2014b. Tamandua tetradactyla. The IUCN Red List of Threatened Species. The IUCN Red List of Threatened Species. <<https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T21350A47442916.en>> (7 June 2020).
- MIRANDA, J.E.S., MELO, F.R., FACHI, M.B., OLIVEIRA, S.R. & UMETSU, R.K. 2018. New records of the Kinkajou, Potos flavus (Schreber, 1774) (Mammalia, Carnivora) in the Cerrado. Check List 14:357–361.
- MITTERMEIER, R.A., GIL, P.R., HOFFMANN, M., PILGRIM, J., BROOKS, T., MITTERMEIER, C.G., LAMOREUX, J. & FONSERCA, G.A.B. 2004. Hotspots revisited. CEMEX.
- MOOJEN, J., LOCK, M. & LANGGUTH, A. 1997. A new species of Kerodon Cuvier, 1824 from the state of Goiás (Mammalia, Rodentia, Caviidae). Bol. Mus. Nac., Nova Sér. Zool. 377:1–10.
- MOREIRA, C.N., VENTURA, K., PERCEQUILLO, A.R. & YONENAGA-YASSUDA, Y. 2020. A review on the cytogenetics of the tribe Oryzomyini (Rodentia: Cricetidae: Sigmodontinae), with the description of new karyotypes. Zootaxa 4876 (1): 001–111.
- MOREIRA, D.D.O., COUTINHO, B.R. & MENDES, S.L. 2008. Current state of knowledge on Espírito Santo mammals based on museum records and published data. Biota Neotrop. 8:163–173. <http://www.biotaneotropica.org.br/v8n2/en/abstract?thematic-review+bn02108022008>.
- MYERS, N., MITTERMEIER, R.A., MITTERMEIER, C.G., FONSECA, G.A.B. & KENT, J. 2000. Biodiversity hotspots for conservation priorities. Nature 403:853–858.
- NAIDOO, S., VOSLOO, D. & SCHOEMAN, M.C. 2016. Pollutant exposure at wastewater treatment works affects the detoxification organs of an urban adapter, the Banana Bat. Environ. Pollut. 208:830–839.
- NASA (National Aeronautics and Space Administration). Estados Unidos, 2002. Disponível em: <<http://www.asterweb.jpl.nasa.gov>>. Acesso em: 4 de julho de 2010.
- NASCIMENTO, F.O., CHENG, J. & FEIJÓ, A. 2021. Taxonomic revision of the pampas cat Leopardus colocola complex (Carnivora: Felidae): an integrative approach. Zool. J. Linn. Soc. 191(2):575–611. <https://doi.org/10.1093/zoolinnean/zlaa043>
- NASCIMENTO, F.O. & FEIJÓ, A. 2017. Taxonomic revision of the tigrina Leopardus tigrinus (Schreber, 1775) species group (Carnivora, Felidae). Pap. Avulsos Zool. 57(19):231–264. <https://doi.org/10.11606/0031-1049.2017.57.19>
- NASCIMENTO, F.F., LAZAR, A., MENEZES, A.N., MATTA DURANS, A., MOREIRA, J.C., SALAZAR- BRAVO, J., D'ANDREA, P.S. & BONVICINO, C.R. 2013. The role of historical barriers in the diversification process in open vegetation formations during the Miocene/Pliocene using an ancient rodent lineage as a model. PLoS ONE 8(4):e61924.
- OLIVEIRA, H.F.M., DE CAMARGO, N.F., GAGER, Y. & AGUIAR, L.M.S. 2017. The response of bats (Mammalia: Chiroptera) to habitat modification in a Neotropical Savannah. Trop. Conser. Sci. 10:1–14.
- OLIVEIRA, R.F., DE MORAIS, A.R. & TERRIBILE, L.C. 2019. Medium- and large-sized mammals in forest remnants of the southern Cerrado: Diversity and ecology. Neotropical Biol. Conserv. 14:29–42.
- PAGLIA, A.P. ET AL. 2012. Lista anotada dos mamíferos do Brasil. Occasional Papers in Conservation Biology.
- PATTON, J.L. & EMMONS, L.H. 2015. Family Dasyproctidae Bonaparte, 1838. In Mammals of South America, Vol 2, Rodents (J.L. Patton, U.F.J. Pardiñas & G. D'Elia, eds). The University of Chicago Press, Chicago and London, p.733–761.
- PATTON, J.L. & LEITE, R.N. 2015. Genus Proechimys JAAllen, 1899. In Mammals of South America, Vol 2, Rodents (J.L. Patton, U.F.J. Pardiñas & G. D'Elia, eds). The University of Chicago Press, Chicago and London, p.950–988.
- PATTON, J.L., PARDIÑAS, U.F.J. & D'ELÍA, G. 2015. Mammals of South America, vol 2. Rodents. The University of Chicago Press, Chicago.
- PAVAN, S.E., JANSA, S.A. & VOSS, R.S. 2014. Molecular phylogeny of short-tailed opossums (Didelphidae: Monodelphis): Taxonomic implications and tests of evolutionary hypotheses. Mol. Phylogenet. Evol. 79C(1):199–214.
- PERCEQUILLO, A.R. 2015. Genus Hylaeamys Weksler, Percequillo, and Voss, 2006 In Mammals of South America, Vol 2, Rodents (J.L. Patton, U.F.J. Pardiñas & G. D'Elia, eds). The University of Chicago Press, Chicago and London, p.335–346.
- PERCEQUILLO, A. & WEKSLER, M. 2018. Euryoryzomys lamia. The IUCN Red List of Threatened Species 2018: e.T15602A739675. <https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T15602A739675.en>. Downloaded on 08 March 2021.
- PELZELN, A.V. 1883. Brasilische säugethiere: resultate von Johann Natterer's Reisen in den Jahren 1817 bis 1835. Verh. der Kaiserlich-Königlichen Zool. Bot. Ges. Wien 33:1–140.
- PRADO, L.A., MIZIARA, F. & FERREIRA, M.E. 2012. Expansão da fronteira agrícola e mudanças no uso do solo na região sul de Goiás: ação antrópica e características naturais do espaço. Bol. Goia. Geogr. 32(1):151–162. <https://doi.org/10.5216/bgg.v32i1.18962>.
- PRADO, J.R. & PERCEQUILLO, A.R. 2013. Geographic distribution of the genera of the Tribe Oryzomyini (Rodentia: Cricetidae: Sigmodontinae) in South America: patterns of distribution and diversity. Arq. Zool. 44 (1): 1–120.
- PRADO, J.R., KNOWLES, L.L. & PERCEQUILLO, A.R. 2021. New species boundaries and the diversification history of marsh rat taxa clarify historical connections among ecologically and geographically distinct wetlands of South America. Mol. Phylogenet. Evol. 155 (2021) 106992.
- QUINTELA, F.M., DA ROSA, C.A. & FEIJÓ, A. 2020. Updated and annotated checklist of recent mammals from Brazil. An Acad. Bras. Cienc. 92:1–57.
- RADAMBRASIL. 1982. Projeto RadamBrasil – levantamento de recursos naturais. Vol. 29. Folha SD. 23 Brasília. Ministério das Minas e Energia, DNPM. Rio de Janeiro.
- REGOLIN, A.L. ET AL. 2017. Forest cover influences occurrence of mammalian carnivores within Brazilian Atlantic Forest. J. Mammal. 98:1721–1731.
- REIS, M.L., ET AL. 2018. Tolypeutes tricinctus (Linnaeus, 1758). In Livro Vermelho da Fauna Brasileira Ameaçada de Extinção, Volume II - Mamíferos (ICMBio/MMA). Brasília, p.53–58.
- RIBEIRO, J.F. & WALTER, B.M.T. 2008. As principais fitofisionomias do bioma Cerrado. In Cerrado: ecologia e flora (S.M. Sano, ed). Embrapa-CPAC, Planaltina, p.151–212.
- RIBEIRO, J.F., WALTER, B.M.T., SANO, S.M. & ALMEIDA, S.D. 1998. Fitofisionomias do Cerrado: Ambiente e flora (S.M. Sano & S.P. Almeida, eds). Embrapa-CPAC, Planaltina, p.89–166.
- RIBEIRO, M.C., METZGER, J.P., MARTENSEN, A.C., PONZONI, F.J. & HIROTA, M.M. 2009. The Brazilian Atlantic Forest: How much is left, and how is the remaining forest distributed? Implications for conservation. Biol. Conserv. 142:1141–1153.
- RIBEIRO, R. & MARINHO-FILHO, J. 2005. Estrutura da comunidade de pequenos mamíferos (Mammalia, Rodentia) da Estação Ecológica de Águas Emendadas, Planaltina, Distrito Federal, Brasil. Rev. Bras. Zool. 22:898–907.
- RÍMOLI, J., MELO, F.R., DOS SANTOS, M.C. & LUDWIG, G. 2018. Sapajus cay (Illiger, 1815). In Livro vermelho da fauna brasileira ameaçada de extinção (ICMBio/MMA, ed.). Instituto Chico Mendes de Conservação da Biodiversidade, Brasília, p.261–267.
- ROACH, N. 2016. Kerodon acrobata. The IUCN Red List of Threatened Species 2016: e.T136222A22190183. <https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T136222A22190183.en>. Downloaded on 08 March 2021.
- ROCHA, C.F.D. ET AL. 2004. Fauna de anfíbios, répteis e mamíferos do Estado do Rio de Janeiro, sudeste do Brasil. Publ. Avulsas Mus. Nac. Rio de Janeiro 104:3–23.
- ROCHA, E.C., BRITO, D., SILVA, P.M., SILVA, J., BERNARDO, P.V.S. & JÜEN, L. 2018. Effects of habitat fragmentation on the persistence of medium and large mammal species in the Brazilian Savanna of Goiás State. Biota Neotrop. 18(3):e20170483. <http://dx.doi.org/10.1590/1676-0611-BN-2017-0483>

- ROCHA, E.C., SILVA, J., SILVA, P.T.D., ARAÚJO, M.D.S. & CASTRO, A.L.D.S. 2019. Medium and large mammals in a Cerrado fragment in Southeast Goiás, Brazil: inventory and immediate effects of habitat reduction on species richness and composition, *Biota Neotrop.* 19(3):e20180671. <http://dx.doi.org/10.1590/1676-0611-bn-2018-0671>
- RODRIGUES, F.H.G. ET AL. 2002. Composição e caracterização da fauna de mamíferos do Parque Nacional das Emas, Goiás, Brasil. *Rev. Bras. Zool.* 19:589–600.
- ROSSI, R.V. ET AL. 2018. *Thylamys velutinus* (Wagner, 1842). In Livro Vermelho da Fauna Brasileira Ameaçada de Extinção: Volume II - Mamíferos. (Instituto Chico Mendes de Conservação da Biodiversidade, ed.). ICMBio, Brasília, p.32–34.
- RUEDAS, L.A. ET AL. 2017. A prolegomenon to the systematics of the South American cottontail rabbits (Mammalia, Lagomorpha, Leporidae: *Sylvilagus*): designation of a neotype for *S. brasiliensis* (Linnaeus, 1758), and restoration of *S. andinus* (Thomas, 1897) and *S. tapetillus* Thomas, 1913. *Misc. Publi. Mus. Zool.* 205:1–67.
- SALAZAR-BRAVO, J., PARDIÑAS, U.F.J., ZEBALLOS, H. & TETA, P. 2016. Description of a new tribe of sigmodontine rodents (Cricetidae: Sigmodontinae) with an updated summary of valid tribes and their generic contents. *Occasional Papers, Museum of Texas Tech University* 338:1–23.
- SANDERSON J. & SILVEIRA, L. 2003. Observations of *Xenarthra* in the Brazilian Cerrado and Guyana. *Edentata* 5:41–44.
- SARTORE, E.R., TAVARES, V.C. & MORAS, L.M. 2017. Subfamília Molossinae Gervais, 1856. In *História Natural dos Morcegos Brasileiros – Chave de Identificação de Espécies* (N.R. Reis, A.L. Peracchi, C.B. Batista, I.P. Lima & A.D. Pereira, eds.). Editora Technical Books, Rio de Janeiro, p.276-318.
- SCHNEIDER, M., ALHO, C.J.R. & AGUIAR, L.M.S. 2011. Contribuição da Reserva Ecológica do IBGE para o conhecimento da mastozoologia do bioma Cerrado. *Reserva Biológica do IBGE - Biodiversidade Terrestre* (M. Ribeiro, ed). Rio de Janeiro: IBGE.
- SETZER, J. 1966. Atlas Climático e Ecológico do Estado de São Paulo. Comissão Interestadual da Bacia Paraná-Uruguaí. 61p.
- SICILIANO, S. ET AL. 2016. New genetic data extend the range of river dolphins *Inia* in the Amazon Delta. *Hydrobiologia* 777:255–269.
- SILVA, C. R. ET AL. 2013. Mammals of Amapá State, Eastern Brazilian Amazonia: A revised taxonomic list with comments on species distributions. *Mammalia* 77:409–424.
- SILVA, J.M.C. & BATES, J.M. 2002. Biogeographic patterns and coservation in the South American Cerrado: A tropical savanna hotspot. *BioScience* 52:225–233.
- SILVA, J.S.Jr., OLIVEIRA, J.A., DIAS, P.A. & OLIVEIRA, T.G. 2005. Update on the geographical distribution and habitat of the tapiti (*Sylvilagus brasiliensis*; Lagomorpha; Leporidae) in the Brazilian Amazon. *Mammalia* 69:245–250.
- SILVA, L.G.D.L., FERREIRA, D.C. & ROSSI, R.V. 2019a. Species diversity of *Marmosa* subgenus *Micoureus* (Didelphimorphia, Didelphidae) and taxonomic evaluation of the white-bellied woolly mouse opossum, *Marmosa constantiae*. *Zool. J. Linn. Society* 187:240–277.
- SILVA, S.M., RUEDAS, A.A., SANTOS, L.H., SILVA, J.J.S. & ALEIXO, A. 2019b. Illuminating the obscured phylogenetic radiation of South American *Sylvilagus* Gray, 1867 (Lagomorpha: Leporidae). *J. Mammal.* 100:31–44.
- SILVEIRA, L., JÁCOMO, A.T.A., FURTADO, M.M., TORRES, N.M., SOLLMANN, R. & VYNNE, C. 2009. Ecology of the giant armadillo (*Prionomys maximus*) in the grasslands of central Brazil. *Edentata* 8–10:25–34.
- SILVEIRA, L., RODRIGUES, F.H.G. & JACOMO, A.T. 1999. Impact of wildfires on the megafauna of Emas National Park, Central Brazil. *Oryx* 33:108–114.
- SOUZA, M.B. ET AL. 2020. Current status of ecotoxicological studies of bats in Brazil. *B. Environ. Contam. Tox.* 104:393–399.
- SOWLS, L.K. 1997. *Javelinas and other peccaries: their biology, management, and use*. 20th edition. Texas A e M University Press, Texas.
- SRBEK-ARAUJO, A.C. & CHIARELLO, A.G. 2004. Is camera-trapping an efficient method for surveying mammals in Neotropical forests? A case study in south-eastern Brazil. *J. Trop. Ecol.* 21:121-125.
- STRASSBURG, B.B.N. ET AL. 2017. Moment of truth for the Cerrado hotspot. *Nature Ecology & Evolution* 1:0099.
- SUÁREZ-VILLOTA, E.Y., CARMIGNOTTO, A.P., BRANDÃO, M.V., PERCEQUILLO, A.R. & SILVA, M.J.J. 2018. Systematics of the genus *Oecomys* (Sigmodontinae: Oryzomyini): molecular phylogenetic, cytogenetic and morphological approaches reveal cryptic species. *Zool. J. Linn. Society* 184:182–210.
- SUCKOW, U.M.S., BIANCONI, G.V., PAROLIN, L.C. & LIMA, I.P. 2010. First occurrences of the greater bonneted *Eumops perotis* (Molossidae) in the State of Paraná and synthesis of the known records for Brazil. *Biota Neotrop.* 10:453–456. <http://www.biotaneotropica.org.br/v10n3/en/abstract?short-communication+bn02310032010>.
- TIEPOLO, L.M. & TOMAS, W.M. 2009. Plano de Conservação para o cervo-dopantanal (*Blastocercus dichotomus*). In Planos de conservação para espécies de mamíferos ameaçadas (G. P. Vidolin, M. G. P. Tussofino & M. M. Britto, eds.). Instituto Ambiental do Paraná/Projeto Paraná Biodiversidade, Paraná, p.176–201.
- TOMAS, W. M. ET AL. 2017. Checklist of mammals from mato Grosso do Sul, Brazil. *Iheringia - Ser. Zool.* 107. e2017155.
- TRIERVEILER, F. 1998. Estrutura e composição da fauna de quirópteros da região do alto Tocantins, GO. Universidade Federal do Rio Grande do Sul.
- UBAID, F.K., MENDONÇA, L.S. & MAFFEI, F. 2010. Contribuição ao conhecimento da distribuição geográfica do tatu-de-rabo-mole-grande *Cabassous tatouay* no Brasil: revisão, status e comentários sobre a espécie. *Edentata* 11:22-28.
- VIVO, M. ET AL. 2011. Checklist dos mamíferos do Estado de São Paulo, Brasil. *Biota Neotrop.* 11:0–21. <http://www.biotaneotropica.org.br/v11n1a/en/abstract?i nventory+bn0071101a2011>.
- VIVO, M. 1998. Diversidade de mamíferos no Estado de São Paulo. *Biodiversidade do Estado de São Paulo* (R. M. Castro, ed). FAPESP, São Paulo.
- VOSS, R.S., DÍAZ-NIETO, J.F. & JANSÁ, S.A. 2018. A Revision of *Philander* (Marsupialia: Didelphidae), Part 1: *P. quica*, *P. canus*, and a New Species from Amazonia. *Am. Mus. Novit.* 3891:1–70.
- VOSS, R.S., GIARLA, T.C., DÍAZ-NIETO, J.F. & JANSÁ, S.A. 2020. A Revision of the Didelphid Marsupial Genus *Marmosa* Part 2. Species of the *Rapposa* Group (Subgenus *Micoureus*). *Bull. Am. Mus. Nat. Hist.* 439:1–62.
- VYNNE, C., MACHADO, R., MARINHO-FILHO, J. & WASSER, S. 2009. Scat detection dogs seek out new locations of *Prionomys maximus* and *Myrmecophaga tridactyla* in central Brazil. *Edentata* 8–10:13–14.
- WEBER, M. & GONZALEZ, S. 2003. Latin American deer diversity and conservation: A review of status and distribution. *Ecoscience* 10:443–.
- ZAPPES, I.A., PORTELLA, A.S. & LESSA, G.M. 2014. Description of karyotype of *Kerodon acrobata*, an endemic rodent in Brazilian Cerrado. *Braz. J. Biol.* 74:251–256.
- ZORTÉA, M. & DARC, F.C. 2019. Diversity of three bat assemblages of Central Brazil. *Mastozool. Neotrop.* 26:468–474.
- ZORTÉA, M., OPREA, M. & MENDES, P. 2017. Subfamília Lonchophyllinae Griffiths, 1982. In *História Natural dos Morcegos Brasileiros – Chave de Identificação de Espécies* (N.R. Reis, A.L. Peracchi, C.B. Batista, I.P. Lima & A.D. Pereira, eds.). Editora Technical Books, Rio de Janeiro, p.173-189.

Received: 11/12/2020

Revised: 07/05/2021

Accepted: 11/05/2021

Published online: 12/07/2021



**Erratum: Checklist of mammals from Goiás, central Brazil**

In the article “Checklist of mammals from Goiás, central Brazil”, with the DOI code number: <https://doi.org/10.1590/1676-0611-BN-2020-1173>, published at Biota Neotropica 21(3): e20201173, on:

Table 1, page 6, column “Record”, where it was written:

1, 2, 11, 12, 16, 17, 19-25 and 77 [MN 55699, UnB 1603-UnB1607]

Should read:

1, 2, 11, 12, 16, 17, 19-25 and 77 [MN 53699, UnB 1603-UnB 1607]

Table 1, page 9, column “Record”, where it was written:

12, 17, 19, 22, 23, 79, 99 [MN 43003, UnB 2636]

Should read:

12, 17, 19, 22, 23, 79, 99 [MN 43004, UnB 2636]

Table 1, page 10, column “Record”, where it was written:

6 [MN 2615, MN 22583, MZUSP 25304]

Should read:

6 [MN 2615, MN 22853, MZUSP 25304]

Table 1, page 10, column “Record”, where it was written:

105, 106, 112 [MN 437, AMNH 134562]

Should read:

105, 106, 112 [MN 32445, AMNH 134562]

Table 1, page 10, column “Record”, where it was written:

13 [MN 62579, UnB 1706]

Should read:

13 [MN 62570, UnB 1706]

Table 1, page 10, column “Record”, where it was written:

91, 113 [MN 62174]

Should read:

91, 113 [MN 62179]

Table 1, page 10, column “Record”, where it was written:

3, 13, 79, 92, 104,108 [MN 67089]

Should read:

3, 13, 79, 92, 104,108 [MN 67086]

Table 1, page 11, column “Record”, where it was written:

1, 3, 106 [UnB 2084, MN 46619, MN 71657]

Should read:

1, 3, 106 [CRB 1115, UNB 1174, UNB 1180]