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TAXONOMIC CATALOG OF THE BRAZILIAN FAUNA

Updated checklist of bats (Mammalia: Chiroptera) from Brazil

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ABSTRACT. We present an updated checklist of Brazilian bats, commenting on the endemic and threatened status of the species listed and providing information on recent taxonomic and nomenclatural changes. The bats of Brazil comprise 186 species, 68 genera, and nine families, with 13 species exclusive to the country. From the previous checklists, we add eight species to Brazil: *Artibeus amplus*, *Choeroniscus godmani*, *Glossophaga bakeri*, *Lichonycteris obscura*, *Platyrrhinus guianensis*, *Trachops ehrhardti*, *Molossus melini* and *Myotis pampa*. The latter is reported for the country for the first time in this study. The Brazilian list of threatened species includes three species as vulnerable (*Furipterus horrens, Lonchophylla bokermanni*, and *Natalus macrourus*) and *Lonchophylla dekeyseri* as endangered. The International Union for the Conservation of Nature (IUCN) lists *Natalus macrourus* as "near threatened", and *Lonchophylla bokermanni* and *L. dekeyseri* as "endangered". Twenty-two additional species are probable for the country. Compared to previous lists, five species are now considered doubtful records and 19 are considered erroneous records. We reinforce the importance of a continuous update of the bat checklists in all Brazilian states as well as taxonomic revisions and bat inventories in unsampled areas.

KEY WORDS. Neotropics, nomenclature, species list, taxonomy.

INTRODUCTION

Lists of species are essential for the scientific community and general users, forming a base on the richness and diversity of studies and projects in conservation, local livelihoods, zoonoses surveillance, and scientific research (Garnett et al. 2020). With that in mind, there has been a recent push to create a single, authoritative list of the Earth's biota, which has been met with a series of publications both for and against the proposal (Raposo et al. 2017, Thomson et al. 2018). Irrespective of the merits associated with the global list proposal, a specific set of 10 principles has been recommended to form the foundation of its governance (Garnett et al. 2020). Among these principles, it is important

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to underscore the imperative for transparent decision-making, unrestricted taxonomic autonomy, and the active pursuit of community support and utilization.

Brazil is one of the megadiverse countries in the world and ranks fourth amongst South American countries with the largest number of bat species, behind Colombia, Ecuador, and Peru (Díaz et al. 2021, Pacheco et al. 2021, Ramírez-Chaves et al. 2022). The first effort to list the bat species occurring in Brazil was made by August von Pelzeln (von Pelzeln 1883), who described the mammals collected by Johann Natterer during the Austrian Expedition to Brazil from 1817 to 1835 and listed 48 species of bats. In the following years, there have been several subsequent efforts to list the bat richness that occurs in Brazil, especially the catalogs that include bats for the entire country (Vieira 1942, 1955), and more frequently after the 1990s (for historical reviews see Vieira 1942, Nogueira et al. 2014).

In 2011, the Brazilian Bat Research Society (Sociedade Brasileira para o Estudo dos Quirópteros – SBEQ) created the Committee of the List of Brazilian Bats (Comitê da Lista de Morcegos do Brasil – CLMB). Since then, the CLMB has been in charge of compiling and maintaining a list of Brazilian bat species, with the initial lists comprising 178 species (Nogueira et al. 2014), 182 species (Nogueira et al. 2018), and 181 species (Garbino et al. 2020a). From the initial workgroup of six, the CLMB now has 13 members as of 2024, all of whom study taxonomic aspects of bat species occurring in Brazil. One goal of the CLMB bat checklist is to create a list that both the scientific community and other important users, such as government stakeholders in charge of threatened species legislation, can use.

Simultaneously with the publication of the CLMB 2020 list, two checklists of Brazilian mammals, including bats, were published by the Brazilian Society of Mammalogy (Sociedade Brasileira de Mastozoologia – SBMz; Abreu et al. 2021) and independent researchers (Quintela et al. 2020). Added to these three recent lists of Brazilian bats, there is an ongoing project to produce a list of the country's animal species that has united more than 800 zoologists to produce an online catalog (Brazilian Zoology Group (2024). This effort, named Taxonomic Catalog of the Brazilian Fauna (Catálogo Taxonômico da Fauna do Brasil – CTFB) is constantly being updated by experts in the field, and includes members of both SBEQ and SBMz committees.

Considering that four checklists of Brazilian bats have been published in the last five years, the goals of this paper are to (1) produce an updated checklist of Brazilian bats to serve as a taxonomic and nomenclatural reference to be used in further research and by stakeholders, such as governmental agencies; and (2) compare the similarities and differences between the new list and the three previous lists.

MATERIAL AND METHODS

To update the checklist of bats native to Brazil, we have considered the latest taxonomic and nomenclatural studies available in the literature (e.g., Velazco and Patterson 2019, Loureiro et al. 2020, Basantes et al. 2020, Fonseca et al. 2024). We have also examined articles that report on range extensions for Brazil (e.g., Velazco et al. 2017, Garbino et al. 2022, Zortéa et al. 2023). Family, genus, and species-level taxonomy follow Wilson and Mittermeier (2019) except where noted.

We considered only formal records of bats for the checklist, which include records from peer-reviewed publications (e.g., articles, books, and short communications) that mention at least one voucher deposited in a zoological collection (Nogueira et al. 2014). Also following Nogueira et al. (2014), three lists are presented herein: a list of the formal records of bats from Brazil, a list of doubtful records, and a list of erroneous records. A formal record was considered doubtful if it was not supported by a voucher, if the taxon had an uncertain taxonomic status, or if the occurrence of the taxon in Brazil was uncertain after a taxonomic revision. An erroneous record was considered as such if the evidence supporting its occurrence in Brazil was refuted or if a taxonomic revision redefined the taxon concept. For example, Pavan and Marroig (2016) restricted *Pteronotus parnellii* to Cuba and Jamaica, and this taxon was considered an erroneous record for Brazil.

We also produced a fourth list, including species that could potentially occur in Brazil. For this, we considered a buffer area of 200 km around the boundaries of the Brazilian territory and verified extralimital records in the literature that fall within this area. The criteria to consider these records as valid followed the same for the formal records. To establish the distribution of marginal taxa, we used the compilations of Rojas et al. (2018), Marsh et al. (2022), and the IUCN shapefile data (https://www.iucnredlist.org/resources/spatial-data-download). After identifying the potential species, we removed taxa that could not occur in Brazil due to geographical barriers (e.g., montane species that fell in the 200 km buffer zone) and also disregarded erroneous records that are present in older shapefiles (e.g., the IUCN distribution polygon of *Molossus sinaloae*). The used distribution polygons overlaid with the 200 km buffer zone can be found in Supplementary Material S1.

RESULTS

Species diversity and endemism

The checklist of bats from Brazil includes 186 species, 68 genera, and nine families (Appendix 1, Fig. 1). Considering that the order Chiroptera now contains 1,466 extant species, Brazil harbors ca. 13% of the world diversity of bats (MDD 2023). Thirteen species are endemic to Brazil: *Dryadonycteris capixaba*, *Glyphonycteris behnii*, *Histiotus alienus*, *Lasiurus ebenus*, *Lonchophylla bokermanni*, *L. inexpectata*, *L. mordax*, *L. peracchii*, *Neoeptesicus taddeii*, *Neonycteris pusilla*, *Platyrrhinus recifinus*, *Trachops ehrhardti,* and *Xeronycteris vieirai* (Appendix 1). The most diverse group is the family Phyllostomidae (96 species), followed by Molossidae (34 species), Vespertilionidae (27 species), Emballonuridae (17 species), Thyropteridae (five species), Mormoopidae (four species), Noctilionidae (two species), Natalidae (one species), and Furipteridae (one species).

The list of doubtful records includes five species (Table 1), and 19 species are now considered erroneous records for the country (Table 2). Considering the bordering records (within the 200 km buffer), there are also 22 bat species of potential occurrence in Brazil (Table 3). All the species listed in Table 1 are also present in Table 3. Detailed maps of the distribution of these marginally occurring species are available in the Supplementary Material S1.

Threatened and near threatened species

The list of threatened species produced by the Ministry of the Environment, Brazilian government, lists three species as vulnerable (*Furipterus horrens*, *Lonchophylla bokermanni*, and *Natalus macrourus*) and one, *Lonchophylla dekeyseri*, as endangered (MMA 2014, 2022, 2023). The International Union for the Conservation of Nature's (IUCN) Red List includes *Natalus macrourus* (named *"Natalus espiritosantensis"*) as "near threatened" (Tejedor and Dávalos 2016) and two species of *Lonchophylla*, *L. bokermanni* and *L. dekeyseri*, as "endangered" (Aguiar 2016, Aguiar and Bernard 2016). Additionally, *Lochophylla mordax, Vampyrum spectrum*, and *Myotis ruber* are classified as "near threatened" in the IUCN.

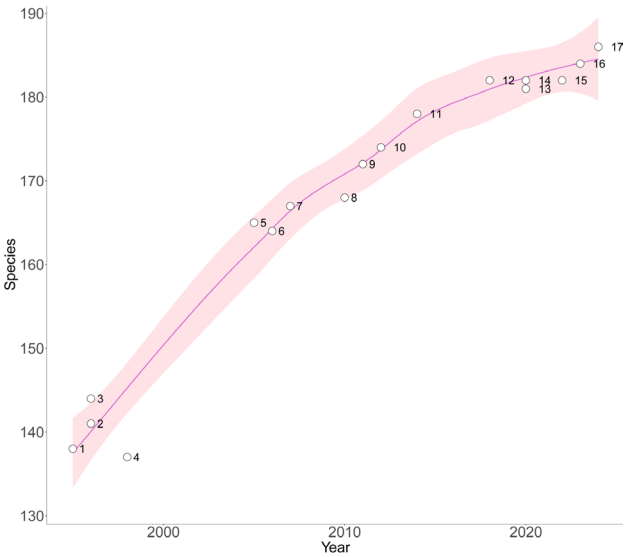

Figure 1. Number of bat species recorded for Brazil according to different checklists produced between 1995 and 2023. We fit a loess regression in the scatterplot. 1: Aguiar and Taddei (1995), 2: Fonseca et al. (1996), 3: Taddei (1996), 4: Marinho-Filho and Sazima (1998), 5: Tavares et al. (2008 – list produced in 2005), 6: Peracchi et al. (2006), 7: Reis et al. (2007), 8: Peracchi et al. (2010), 9: Peracchi et al. (2011), 10: Paglia et al. (2012), 11: Nogueira et al. (2014), 12: Nogueira et al. (2018), 13: Garbino et al. (2020a), 14: Quintela et al. (2020), 15: Abreu et al. (2022), 16: Abreu et al. (2023), 17: This study.

DISCUSSION

Comparisons among the lists

While it is desirable to maintain species lists as stable as possible, taxonomic revisions and consequent changes are an integral aspect of scientific progress and facilitate communication within the scientific community. In this context, we briefly discuss here the main differences between the most recent lists of Brazilian bats.

From the latest checklist developed by the Committee of the List of Brazilian Bats (CLMB; Garbino et al. 2020a),

Table 1. List of bat species with doubtful records for Brazil. In the Reference column, we cite the source for the doubtful records.

Family	Taxon	Reference
Phyllostomidae	*Artibeus glaucus* Thomas, 1893	Koopman (1993)
Phyllostomidae	*Artibeus phaeotis* (Miller, 1902)	Taddei (1996)
Phyllostomidae	*Carollia castanea* H. Allen, 1890	Uieda (1980)
Phyllostomidae	*Lonchorhina orinocensis* Linares & Ojasti, 1971	Taddei (1996)
Phyllostomidae	*Lonchorhina marinkellei* Hernández-Camacho & Cadena, 1978	Taddei (1996)

Table 2. List of erroneous records of bat species in Brazil, considering Nogueira et al. (2014) as a starting point.

Family	Taxon	Reason for removal	Reference
Phyllostomidae	*Carollia subrufa* (Hahn, 1905)	Specimens reidentified as *Carollia brevicauda*	Nogueira et al. (2014)
Phyllostomidae	*Chiroderma salvini* Dobson, 1878	Specimens reidentified as *Chiroderma villosum*	Garbino et al. (2020b)
Phyllostomidae	*Chiroderma vizottoi* Taddei & Lim, 2010	Considered valid as subspecies of *C. doriae*	Garbino et al. (2020b)
Phyllostomidae	*Enchisthenes hartii* (Thomas, 1892)	Erroneous identification	Nogueira et al. (2014)
Phyllostomidae	*Lichonycteris degener* Miller, 1931	Junior synonym of *Lichonycteris obscura* Thomas, 1895	Zamora-Gutierrez and Ortega (2020)
Phyllostomidae	*Micronycteris brosseti* Simmons & Voss, 1998	Specimen reidentified as *Micronycteris* sp.	Garbino (2016)
Phyllostomidae	*Micronycteris homezorum* Pirlot, 1967	Junior synonym of *Micronycteris minuta* (P. Gervais, 1856)	Ochoa and Sánchez (2005)
Phyllostomidae	*Platyrrhinus helleri* (Peters, 1866)	Specimens reidentified as *Platyrrhinus incarum*	Garbino et al. (2024)
Phyllostomidae	*Sturnira bidens* (Thomas, 1915)	Specimen reidentified as *Stunira lilium*	Nogueira et al. (2014)
Phyllostomidae	*Tonatia saurophila* Koopman & Williams, 1951	Restricted to a fossil from Jamaica	Basantes et al. (2020)
Mormoopidae	*Pteronotus davyi* Gray, 1838	Specimen reidentified as *Pteronotus gymnonotus*	Nogueira et al. (2014)
Mormoopidae	*Pteronotus parnellii* (Gray, 1843)	Restricted to the Antilles	Pavan and Marroig (2016)
Vespertilionidae	*Neoeptesicus andinus* J.A. Allen, 1914	Specimen reidentified as *Neoeptesicus* sp.	This study
Vespertilionidae	*Eptesicus fuscus* (Palisot de Beauvois, 1796)	Specimens reidentified as *Neoeptesicus furinalis*	Nogueira et al. (2014)
Vespertilionidae	*Lasiurus atratus* Handley, 1996	Specimens reidentified as *Lasiurus castaneus*	Nogueira et al. (2014)
Vespertilionidae	*Lasiurus cinereus* (Palisot de Beauvois, 1796)	Restricted to North America	Baird et al. (2015)
Vespertilionidae	*Lasiurus salinae* Thomas, 1902	Considered valid as subspecies of *L. blossevillii*	Baird et al. (2015)
Vespertilionidae	*Myotis alter* Miller & G.M. Allen, 1928	Junior synonym of *Myotis levis* (I. Geoffroy, 1824)	Wilson (2008)
Vespertilionidae	*Myotis dinellii* Thomas, 1902	Specimens reidentified as *Myotis albescens*	Moratelli et al. (2019)

Table 3. List of bat species potentially occurring in Brazil. See Supplementary Material S1 for their distribution maps. In the Reference column, we cite the source for the closest formal records to the Brazilian border.

Family	Taxon	Reference
Emballonuridae	*Centronycteris centralis* Thomas, 1912	Hice and Solari (2002)
Phyllostomidae	*Artibeus glaucus* Thomas, 1893	Handley (1987)
Phyllostomidae	*Artibeus phaeotis* (Miller, 1902)	Handley (1987)
Phyllostomidae	*Carollia castanea* H. Allen, 1890	Shapley et al. (2005)
Phyllostomidae	*Enchisthenes hartii* (Thomas, 1892)	Solari et al. (2006)
Phyllostomidae	*Hsunycteris dashe* Velazco et al., 2017	Velazco et al. (2017)
Phyllostomidae	*Lonchorhina fernandezi* Ochoa & Ibáñez, 1984	Ochoa and Ibáñez (1984)
Phyllostomidae	*Lonchorhina orinocensis* Linares & Ojasti, 1971	Hernández-Camacho and Cadena (1978)
Phyllostomidae	*Lonchorhina marinkellei* Hernández-Camacho & Cadena, 1978	Hernández-Camacho and Cadena (1978)
Phyllostomidae	*Micronycteris brosseti* Simmons & Voss, 1998	Simmons and Voss (1998)
Phyllostomidae	*Micronycteris matses* Simmons, Voss & Fleck, 2002	Simmons et al. (2002)
Phyllostomidae	*Micronycteris yatesi* Siles & Brooks, 2013	Siles et al. (2013)
Molossidae	*Eumops nanus* (Miller, 1900)	Eger (1977)
Molossidae	*Molossus alvarezi* González-Ruiz, Ramírez-Pulido & Arroyo-Cabrales, 2011	Loureiro et al. (2019)
Molossidae	*Molossus fentoni* Loureiro, Lim & Engstrom, 2018	Loureiro et al. (2018)
Molossidae	*Nyctinomops mbopicuare* Barquez et al., 2023	Barquez et al. (2023)
Vespertilionidae	*Histiotus humboldti* Handley, 1996	Handley (1996)
Vespertilionidae	*Lasiurus atratus* Handley, 1996	Handley (1996)
Vespertilionidae	*Myotis clydejonesi* Moratelli et al., 2016	Moratelli et al. (2016)
Vespertilionidae	*Myotis midastactus* Moratelli & Wilson, 2014	Moratelli and Wilson (2014)
Vespertilionidae	*Neoeptesicus orinocensis* (Ramírez-Chaves et al., 2021)	Ramírez-Chaves et al. (2021)
Natalidae	*Natalus tumidirostris* Miller, 1900	Williams et al. (1983)

eight species were added (*Artibeus amplus*, *Choeroniscus godmani*, *Glossophaga bakeri*, *Lichonycteris obscura*, *Platyrrhinus guianensis*, *Molossus melini*, *Trachops ehrhardti*, and *Myotis pampa*), and three species were removed (*Glossophaga commissarisi*, *Micronycteris homezorum* and *Lichonycteris degener*).

The Taxonomic Catalog of the Brazilian Fauna (TCBF) differs from the present list in the following aspects: (1) the TCBF considers *Micronycteris brosseti* (Phyllostomidae) as occurring in Brazil, which we do not (see Garbino 2016); (2) it treats *M. homezorum* as valid, while we consider it as a synonym of *M. minuta*; (3) the TCBF considers the species *Chiroderma vizottoi* as valid, while we treat it as a subspecies of *C. doriae* (Garbino et al. 2020b); (4) the mormoopid *Pteronotus parnellii* is still present in the TCBF, but now it has been considered endemic to the Antilles, whereas the name available for the Brazilian populations is *P. rubiginosus* (Pavan and Marroig 2016; Pavan 2019); (5) in the family Molossidae, the TCBF considers *Cynomops paranus* of Thomas, 1901 as valid, while we treat it as a synonym of *C. planirostris* (Moras et al. 2016, 2018); (6) we included *Eumops chimaera*, which has not been included in the TCBF; (7) the Vespertilionidae in the TCBF differs in not including the valid taxon *Histiotus diaphanopterus*, and by including *Lasiurus cinereus* and *L. salinae*, which are not considered valid or occur elsewhere (Baird et al. 2015). These inconsistencies in the TCBF stem from the fact that it is a multi-author list that can be updated at any time. As a result, some taxa were last updated in 2015, and others were altered in the last couple of years.

The main difference between the list presented here and Quintela et al. (2020), is that the latter authors did not include *Lasiurus villosissimus*, included *L. cinereus*, which does not occur in Brazil, and considered *L. salinae* valid, despite the considerations of a previous study (Baird et al. 2015). The former authors also consider *Cynomops paranus* as valid, despite previous studies treating it as a junior synonym of *C. planirostris* (Moras et al. 2016, 2018). Additionally, Quintela et al. (2020) included *Myotis dinellii* in their checklist, which is not considered to occur in Brazil, as the records are misidentifications of *Myotis albescens* (see Nogueira et al. 2018).

The 2022 checklist from the Brazilian Society of Mammalogy (SBMz) listed 182 bat species in Brazil (Abreu et al. 2022), differing solely in terms of recent post-2022 changes that we have incorporated into the current list. The most recent checklist from the SBMz includes the same species presented here, except for *Molossus melini* and *Trachops ehrhardti* (Abreu et al. 2023). The SBMz committee shares members with the SBEQ list and both societies aim to have the same list for Chiroptera. Therefore, as the SBMz is updated, it should be congruent with the list presented here.

We note that *Artibeus amplus* and *C. godmani* were previously considered doubtful records for Brazil (Nogueira et al. 2014), and their removal from this category is the main change in our second list (Table 1). We have also, in this study, removed *Myotis alter* from the doubtful record list and assigned it as an erroneous record (Table 2). The 22 species with potential occurrence in Brazil (Table 3) represent ca. 10% of current number reported for the country, and include mostly phyllostomids (10), but also vespertilionids (4), and molossids (3). These three families also account for most records in our main list (Appendix 1). In 1996, Taddei estimated the number of bat species that could potentially be recorded in Brazil based on geographic proximity, accounting for 22 species (Taddei 1996). Nearly three decades later, it has been confirmed that eight of these species do indeed occur in the country. One species predicted by him, *Natalus tumidirostris*, is also present in our list or potential species, but the other 13 he assigned were not considered here because their closest records either fall outside our 200 km buffer, or, if within it, they were restricted to higher altitudes along the eastern Andes.

Taxonomic and nomenclatural comments

Micronycteris homezorum – In our first assessment, we retained *M. homezorum* Pirlot, 1967 as valid (Nogueira et al. 2014), contra Ochoa and Sánchez (2005). However, because species limits in the subgenus *Schizonycteris* are still unclear and *M. minuta* might represent a species complex (Morales-Martínez et al. 2021), we opted for following Ochoa and Sánchez (2005) and several recent authors in treating this species as junior synonym of *M. minuta* (Siles and Baker 2020, Díaz et al. 2021, Morales-Martínez et al. 2021, Simmons and Cirranello 2023), until additional data are available.

Micronycteris sanborni – Solari et al. (2019) have considered the records of *M. sanborni* from Bolivia to be referable to *M. yatesi*. However, a recent revision of Bolivian bats mentions *M. sanborni* for the country (Poma-Urey et al. 2020, 2023). Therefore, we do not consider *M. sanborni* a Brazilian endemic.

Gardnerycteris crenulata – Brandão et al. (2019) were the first to correct the spelling of *Gardnerycteris crenulatum* to *G. crenulata* to agree with the feminine *-nycteris*. We followed their suggestion, as did the Mammal Diversity Database and batnames lists (MDD 2023, Simmons and Cirranello 2023).

Trachops ehrhardti – Williams and Genoways (2008) recognize a polytypic *Trachops* with two subspecies occur-

ring in Brazil: *T. c. cirrhosus* (Spix, 1823) and *T. c. ehrhardti* Felten, 1956. An unpublished PhD dissertation suggested treating *ehrhardti* as a full species based on DNA sequence data and morphology (Fonseca 2019). The Mammal Diversity Database includes *ehrhardti* "tentatively" in *cirrhosus*, citing the unpublished dissertation of Fonseca (2019). The 2022B version of Batnames (https://doi.org/10.5281/zenodo.6857865) lists *T. ehrhardti* as a valid species, but the 2023 update (Version 1.3) treats it as a junior synonym of *T. cirrhosus*. A recent study provided morphological and molecular evidence for splitting *T. cirrhosus* in three species, suggesting that *T. ehrhardti* is endemic to southern and southeastern Brazil (Fonseca et al. 2024).

Choeroniscus godmani – We include the species in the list, following Garbino et al. (2022), who recorded the species in Brazil based on museum specimens, including material collected in 1977 in the state of Mato Grosso.

Glossophaga commissarisi and *G. bakeri* – Webster and Jones (1987) originally described *bakeri* as a subspecies of *Glossophaga commissarisi* from the western Amazonia of Brazil, Colombia, and Peru. However, Velazco et al. (2021) showed that *bakeri* is morphologically distinct from *G. commissarisi* and should be recognized as a distinct species, endemic to the western Amazonia. Following the latter authors, we consider the records of *G. commissarisi* from Brazil to represent *G. bakeri*.

Lichonycteris obscura and *L. degener* – We follow Zamora-Gutierrez and Ortega (2020) in considering *L. degener* Miller, 1931 as a junior synonym of *L. obscura* Thomas, 1895 pending a taxonomic revision of the genus. Although Griffiths and Gardner (2008) recognize two species in *Lichonycteris*, the authors point out that Miller compared *degener* with a specimen of "*obscura*" that probably was collected in Brazil. Other authors treat *Lichonycteris* as monotypic (Gardner 1976, Hill 1985, Zamora-Gutierrez and Ortega 2020).

Glyphonycteris behnii – Here, we consider the species to be endemic to Brazil, due to re-identification of the Bolivian specimen, which is a *Micronycteris hirsuta* (Poma-Urey et al. 2023).

Carollia brevicauda – Solari et al. (2019) suggested using the spelling *brevicaudum* for *C. brevicauda*, arguing that the original description as *Phyllostoma brevicaudum* Schinz, 1821 should be followed and that an emendation would be unjustified. Considering that the author of the genus *Carollia*, and the first subsequent authors that used it, considered the name as feminine (Gray 1838, 1866, Peters 1865), we assume the gender as feminine. We also follow Article 30.2 of The International Code of Zoological Nomenclature, which states that "If no gender was specified or indicated, the name is to be treated as masculine, except that, if the name ends in -a the gender is feminine." The genitive of the feminine *cauda* is *caudae* and the stem is *caud-*. Therefore, considering that *Carollia* is a feminine noun, the species name would be *Carollia brevicauda* (Handley 1980).

Artibeus amplus – We include this species of subgenus *Artibeus* in the list, following Zortéa et al. (2023).

Platyrrhinus guianensis – We include the species in the list, following Lopes et al. (2023).

Platyrrhinus helleri – Despite appearing in recent papers on Brazilian bats (Fischer et al. 2015, 2022, Acero-Murcia et al. 2023), the occurrence of *P. helleri* has been restricted to northern South America west of the Andes and to Mexico/Central America (Velazco et al. 2010). Garbino et al. (2024) have sequenced mitochondrial DNA from specimens of small-sized *Platyrrhinus* from the Brazilian Cerrado and Pantanal and confirmed that the taxon occurring in the region is *P. incarum*.

Molossus melini – This recently described species was previously known only for Argentina and has now been recorded for Curitiba, in the Brazilian state of Paraná (Montani et al. 2021, Olímpio et al. 2024)

Genus *Lasiurus* – Baird et al. (2015) classified hoary, yellow, and red bats into three genera, respectively, *Aeorestes*, *Dasypterus*, and *Lasiurus* based on molecular and phenotypic divergences. As *Lasiurus*, the generic name used to encompass these bats, is still monophyletic and the morphological differences among the clades are not sharply contrasting, we retain the use of a single genus *Lasiurus* for red, yellow, and hoary bats. In this case, the use of subgenera is recommended to maintain binomen stability and still convey the idea of three distinct clades (Garbino 2015, Novaes et al. 2018, Teta 2019, Burgin 2023).

Neoeptesicus – We use here the genus name *Neoeptesicus* Cláudio et al., 2023, for the Brazilian taxa formerly included in *Eptesicus*. Over the last decades, *Eptesicus* (sensu lato) has been recovered as non-monophyletic in molecular phylogenies (Hoofer and Bussche 2003, Juste et al. 2013, Yi and Latch 2022), and different taxonomic arrangements were proposed and used to solve this. Cláudio et al. (2023) reevaluated the taxonomic status of *Eptesicus* and restricted the name to the type species *Eptesicus fuscus* (Palisot de Beauvois, 1796), as well as *E. guadeloupensis* Genoways & Baker, 1975, and *E. miradorensis* (H. Allen, 1866), all of which do not occur in Brazil (Ramírez-Chaves et al. 2023). All other New World species were allocated to *Neoeptesicus*. As consequence of this arrangement, we use *Histiotus* as genus,

instead as a subgenus of *Eptesicus*, which was proposed by some authors (e.g., Giménez et al. 2019).

Neoeptesicus andinus – The occurrence of *N. andinus* in Brazil is based on a specimen from Anápolis, Goiás (AMNH 134910). This specimen was named by Davis (1966) as *Eptesicus montosus montosus* in his broad review of South American *Eptesicus*. Later, Simmons and Voss (1998) partially reviewed the taxonomy of *Eptesicus andinus* and *E. chiriquinus*, and listed *E. montosus* as conspecific with *E. andinus* (Davis and Gardner 2008). We compared the specimen AMNH 134910 with the holotype of *Eptesicus andinus* (AMNH 33807) and it does not share the diagnostic traits of *E. andinus*. Considering this, we opted to remove *E. andinus* from the list, and the identity of specimen AMNH 134910 remains uncertain pending additional morphological and molecular analyses. Pine et al. (1970) mention *E. m. montosus* (USNM 393769) for Mato Grosso state; this specimen was examined by us and does not represent *Neoeptesicus andinus*.

Myotis pampa – We add here the first record of *M. pampa* for Brazil, based on specimen AMNH 235919 from Candelária, Rio Grande do Sul. This species was described based on specimens from Uruguayan grasslands, very close to the Brazil border. Although its occurrence in Brazil was considered probable by Novaes et al. (2021), the present record is the first to confirm its occurrence in Brazil.

Final remarks

Knowledge of bat diversity in Brazil seems to be close to an asymptote (Fig. 1). However, this may be result of having several lists published in a short time interval. Despite having a more stable species list of Brazilian bats, there are still knowledge gaps on the specific occurrence records of the species in the country. For example, less than half of the 27 Brazilian Federative Units have updated bat checklists (Tavares et al. 2024). Even in states that have bat checklists, dramatic changes can be seen as these lists are updated (Ferreira et al. 2024). Also, a vast area of Brazil is undersampled for bats (Bernard et al. 2011), increasing the potential of obtaining new records for the country. We suggest that future efforts focus on cataloging bat diversity in each Federative Unit of Brazil, refining our knowledge of species occurring in each ecosystem. A more detailed species-level list, including subspecies, is also important to refine our understanding of Brazilian bat diversity.

In this context, collections-based research is essential, as well as the collection and proper curation of specimens from poorly sampled regions. There has been an increase in local and regional mammal collections in Brazil, which must be followed by investment in research and infrastructure (Chiquito et al. 2021). It is also important to reiterate that several ongoing systematic studies involving bat taxa occurring in Brazil (e.g., *Anoura*, *Furipterus, Lonchophylla*, *Myotis, Neoeptesicus*, *Nyctinomops*, and *Histiotus*) are likely to lead to taxonomic rearrangements in the near future. Likewise, frequent faunal inventories and more refined studies using molecular methods for taxonomic identification may yield new records for Brazil. Consequently, the publication of reliable, comprehensive, and regularly updated listings, along with notes on range extensions, should always be prioritized.

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The authors have declared that no competing interests exist.

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Supplementary material 1

Supplementary S1. Maps of bat species potentially occurring in Brazil.

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Appendix 1. List of families, subfamilies, genera, and species of bats that occur in Brazil. Subfamilies of Phyllostomidae are arranged in phylogenetic order, following Solari et al. (2019). Endemic species are denoted with an asterisk.

Chiroptera Blumenbach, 1779
(9 families, 68 genera, 186 species)

Emballonuridae Gervais, 1856
(7 genera, 17 species)

Emballonurinae Gervais, 1856
- *Centronycteris maximiliani* (Fischer, 1829)
- *Cormura brevirostris* (Wagner, 1843)
- *Cyttarops alecto* Thomas, 1913
- *Diclidurus albus* Wied, 1820
- *Diclidurus ingens* Hernández-Camacho, 1955
- *Diclidurus isabella* (Thomas, 1920)
- *Diclidurus scutatus* Peters, 1869
- *Peropteryx kappleri* Peters, 1867
- *Peropteryx leucoptera* Peters, 1867
- *Peropteryx macrotis* (Wagner, 1843)
- *Peropteryx pallidoptera* Lim et al., 2010
- *Peropteryx trinitatis* Miller, 1899
- *Rhynchonycteris naso* (Wied, 1820)
- *Saccopteryx bilineata* (Temminck, 1838)
- *Saccopteryx canescens* Thomas, 1901
- *Saccopteryx gymnura* Thomas, 1901
- *Saccopteryx leptura* (Schreber, 1774)

Phyllostomidae Gray, 1825
(43 genera, 96 species)

Micronycterinae Van Den Bussche, 1992
- *Lampronycteris brachyotis* (Dobson, 1879)
- *Micronycteris hirsuta* (Peters, 1869)
- *Micronycteris megalotis* (Gray, 1842)
- *Micronycteris microtis* Miller, 1898
- *Micronycteris minuta* (Gervais, 1856)
- *Micronycteris sanborni* Simmons, 1996
- *Micronycteris schmidtorum* Sanborn, 1935

Desmodontinae Wagner, 1840
- *Desmodus rotundus* (É. Geoffroy, 1810)
- *Diaemus youngii* (Jentnik, 1893)
- *Diphylla ecaudata* Spix, 1823

Lonchorhininae Gray, 1866
- *Lonchorhina aurita* Tomes, 1863
- *Lonchorhina inusitata* Handley & Ochoa, 1997

Phyllostominae Gray, 1825
- *Chrotopterus auritus* (Peters, 1856)
- *Gardnerycteris crenulata* (É. Geoffroy, 1803)
- *Lophostoma brasiliense* Peters, 1867
- *Lophostoma carrikeri* (Allen, 1910)
- *Lophostoma schulzi* (Genoways & Williams, 1980)
- *Lophostoma silvicola* d'Orbigny, 1836
- *Macrophyllum macrophyllum* (Schinz, 1821)
- *Mimon bennettii* (Gray, 1838)
- *Phylloderma stenops* Peters, 1865
- *Phyllostomus discolor* Wagner, 1843
- *Phyllostomus elongatus* (É. Geoffroy, 1810)
- *Phyllostomus hastatus* (Pallas, 1767)
- *Phyllostomus latifolius* (Thomas, 1901)
- *Tonatia bidens* (Spix, 1823)
- *Tonatia maresi* Williams, Willig & Reid, 1995
- *Trachops cirrhosus* (Spix, 1823)
- *Trachops ehrhardti* Felten, 1956 *
- *Vampyrum spectrum* (Linnaeus, 1758)

Glossophaginae Bonaparte, 1845
- *Anoura caudifer* (É. Geoffroy, 1818)
- *Anoura geoffroyi* Gray, 1838
- *Choeroniscus godmani* (Thomas, 1903)
- *Choeroniscus minor* (Peters, 1868)
- *Dryadonycteris capixaba* Nogueira et al., 2012 *
- *Glossophaga bakeri* Webster & Jones, 1987
- *Glossophaga longirostris* Miller, 1898
- *Glossophaga soricina* (Pallas, 1766)
- *Lichonycteris obscura* Thomas, 1895
- *Scleronycteris ega* Thomas, 1912

Lonchophyllinae Griffiths, 1982
- *Hsunycteris pattoni* (Woodman & Timm, 2006)
- *Hsunycteris thomasi* (Allen, 1904)
- *Lionycteris spurrelli* Thomas, 1913
- *Lonchophylla bokermanni* Sazima, Vizotto & Taddei, 1978 *
- *Lonchophylla dekeyseri* Taddei, Vizotto & Sazima, 1983
- *Lonchophylla inexpectata* Moratelli & Dias, 2015 *
- *Lonchophylla mordax* Thomas, 1903 *
- *Lonchophylla peracchii* Dias, Esbérard & Moratelli, 2013 *
- *Xeronycteris vieirai* Gregorin & Ditchfield, 2005 *

Carolliinae Miller, 1924
- *Carollia benkeithi* Solari & Baker, 2006
- *Carollia brevicauda* (Schinz, 1821)
- *Carollia perspicillata* (Linnaeus, 1758)

Glyphonycterinae Baker et al., 2016
- *Glyphonycteris behnii* (Peters, 1865) *
- *Glyphonycteris daviesi* (Hill, 1964)
- *Glyphonycteris sylvestris* Thomas, 1896
- *Neonycteris pusilla* (Sanborn, 1949) *
- *Trinycteris nicefori* (Sanborn, 1949)

Rhinophyllinae Baker et al., 2016
Rhinophylla fischerae Carter, 1966
Rhinophylla pumilio Peters, 1865
Stenodermatinae Gervais, 1856
Ametrida centurio Gray, 1846
Artibeus amplus Handley, 1987
Artibeus anderseni Osgood, 1916
Artibeus bogotensis Andersen, 1906
Artibeus cinereus (Gervais, 1856)
Artibeus concolor Peters, 1865
Artibeus fimbriatus Gray, 1838
Artibeus gnomus Handley, 1987
Artibeus lituratus (Olfers, 1818)
Artibeus obscurus (Schinz, 1821)
Artibeus planirostris (Spix, 1823)
Chiroderma doriae Thomas, 1891
Chiroderma trinitatum Goodwin, 1958
Chiroderma villosum Peters, 1860
Mesophylla macconnelli Thomas, 1901
Platyrrhinus angustirostris Velazco, Gardner & Patterson, 2010
Platyrrhinus aurarius (Handley & Ferris, 1972)
Platyrrhinus brachycephalus (Rouk & Carter, 1972)
Platyrrhinus fusciventris Velazco, Gardner & Patterson, 2010
Platyrrhinus guianensis Velazco & Lim, 2014
Platyrrhinus incarum (Thomas, 1912)
Platyrrhinus infuscus (Peters, 1880)
Platyrrhinus lineatus (É. Geoffroy, 1810)
Platyrrhinus recifinus (Thomas, 1901) *
Pygoderma bilabiatum (Wagner, 1843)
Sphaeronycteris toxophyllum Peters, 1882
Sturnira giannae Velazco & Patterson, 2019
Sturnira lilium (É. Geoffroy, 1810)
Sturnira magna de la Torre, 1966
Sturnira tildae de la Torre, 1959
Uroderma bilobatum Peters, 1866
Uroderma magnirostrum Davis, 1968
Vampyressa pusilla (Wagner, 1843)
Vampyressa thyone Thomas, 1909
Vampyriscus bidens (Dobson, 1878)
Vampyriscus brocki (Peterson, 1968)
Vampyrodes caraccioli (Thomas, 1889)

Mormoopidae Saussure, 1860 (1 genus, 4 species)

Pteronotus alitonus Pavan, Bobrowiec & Percequillo, 2018
Pteronotus gymnonotus (Wagner, 1843)
Pteronotus personatus (Wagner, 1843)
Pteronotus rubiginosus (Wagner, 1843)

Noctilionidae Gray, 1821 (1 genus, 2 species)

Noctilio albiventris Desmarest, 1818
Noctilio leporinus (Linnaeus, 1758)

Furipteridae Gray, 1866 (1 genus, 1 species)

Furipterus horrens (Cuvier, 1828)

Thyropteridae Miller, 1907 (1 genus, 5 species)

Thyroptera devivoi Gregorin et al., 2006
Thyroptera discifera (Lichtenstein & Peters, 1854)
Thyroptera lavali Pine, 1993
Thyroptera tricolor (Spix, 1823)
Thyroptera wynneae Velazco et al., 2014

Natalidae Gray, 1866 (1 genus, 1 species)

Natalus macrourus (Gervais, 1856)

Molossidae Gervais, 1856 (8 genera, 33 species)

Molossinae Gervais, 1856
Cynomops abrasus (Temminck, 1826)
Cynomops greenhalli Goodwin, 1958
Cynomops mastivus (Thomas, 1911)
Cynomops milleri (Osgood, 1914)
Cynomops planirostris (Peters, 1866)
Eumops auripendulus (Shaw, 1800)
Eumops bonariensis (Peters, 1874)
Eumops chimaera Gregorin et al., 2016
Eumops dabbenei Thomas, 1914
Eumops delticus Thomas, 1923
Eumops glaucinus (Wagner, 1843)
Eumops hansae Sanborn, 1932
Eumops maurus (Thomas, 1901)
Eumops patagonicus Thomas, 1924
Eumops perotis (Schinz, 1821)
Eumops trumbulli (Thomas, 1901)
Molossops neglectus Williams & Genoways, 1980
Molossops temminckii (Burmeister, 1854)
Molossus aztecus Saussure, 1860
Molossus coibensis Allen, 1904
Molossus currentium Thomas, 1901
Molossus fluminensis Lataste, 1891
Molossus melini Montani et al., 2021

Molossus molossus (Pallas, 1766)
Molossus pretiosus Miller, 1902
Molossus rufus É. Geoffroy, 1805
Neoplatymops mattogrossensis (Vieira, 1942)
Nyctinomops aurispinosus (Peale, 1848)
Nyctinomops laticaudatus (É. Geoffroy, 1805)
Nyctinomops macrotis (Gray, 1840)
Promops centralis Thomas, 1915
Promops nasutus (Spix, 1823)
Tadarida brasiliensis (I. Geoffroy, 1824)

Vespertilionidae Gray, 1821
(5 genera, 27 species)

Vespertilioninae Gray, 1821
Histiotus alienus Thomas, 1916 *
Histiotus diaphanopterus Feijó, Rocha & Althoff, 2015
Histiotus laephotis Thomas, 1916
Histiotus montanus (Philippi & Landbeck, 1861)
Histiotus velatus (I. Geoffroy, 1824)
Lasiurus blossevillii ([Lesson, 1826])
Lasiurus castaneus Handley, 1960
Lasiurus ebenus Fazzolari-Corrêa, 1994 *
Lasiurus ega (Gervais, 1856)
Lasiurus egregius (Peters, 1870)
Lasiurus villosissimus (É. Geoffroy, 1806)
Neoeptesicus brasiliensis (Desmarest, 1819)
Neoeptesicus chiriquinus (Thomas, 1920)
Neoeptesicus diminutus (Osgood, 1915)
Neoeptesicus furinalis (d'Orbigny & Gervais, 1847)
Neoeptesicus taddeii (Miranda, Bernardi & Passos, 2006) *
Rhogeessa hussoni Genoways & Baker, 1966
Rhogeessa io Thomas, 1903
Myotinae Tate, 1942
Myotis albescens (É. Geoffroy, 1806)
Myotis izecksohni Moratelli et al., 2011
Myotis lavali Moratelli et al., 2011
Myotis levis (I. Geoffroy, 1824)
Myotis nigricans (Schinz, 1821)
Myotis pampa Novaes, Wilson & Moratelli, 2021
Myotis riparius Handley, 1960
Myotis ruber (É. Geoffroy, 1806)
Myotis simus Thomas, 1901