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SHORT COMUNICATION

List of popular names for Brazilian rodents (Mammalia: Rodentia)

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ABSTRACT. Binomial nomenclature in Latin is used to name species, allowing communication between scientists but not with the general public. We compiled popular names in Portuguese, Spanish, and English for the rodent species that occur in Brazil, revealing a large gap in Portuguese, where 11.5% of the species do not have common names, or they share a same name, as 66 of the Echimyidae ("toró"), and 57 of the Cricetidae species ("rato-do-mato"). In contrast, almost all species have common names in English, which are generally unique. To highlight the importance of ecosystem services that rodents provide to society, it is essential to provide common names in the local language where the species was described.

KEY WORDS. Common name, popularization of science, Rodentia, vernacular name.

The use of standardized scientific names is essential for clear and universal communication in science. Unlike vernacular names, latinized scientific names are not subject to regional variations or language differences (Sitas et al. 2009, Bennett and Balick 2014, García-de-Lomas et al. 2021). Scientists generally prefer to use scientific names over vernacular names for this reason (Jarić et al. 2016). Such standardization is so essential that spelling errors are a problem for search engines, as such errors will prevent certain articles from being found during a search (Bennett and Balick 2014). However, the use of Latin terminology can create a barrier with the general public, potentially reducing empathy and engagement with conservation efforts (García-de-Lomas et al. 2021).

Much of our knowledge about different species, especially mammals, comes from the shared knowledge of communities that live in direct contact with natural areas and name these species (Víquez et al. 2014). The use of common or popular names is preferred in press releases and media coverage, while Latinized scientific names are often absent (Roberge 2014).

Vernacular names are commonly based on attractive or repulsive characteristics of the animals and reflect the history of the local population's relationship with the native fauna (Dice 1937, Simpson 1941, Superina and Aguiar 2006). Because of this, they can show significant geographic and regional variation. As a result, a single species may have

multiple common names across different areas (Papavero 2017, Gonzalez et al. 2020). For species that lack a common or vernacular name, creating such a name has the potential to increase public interest, particularly among children, in those species (García-de-Lomas et al. 2021, Marinho and Scatigna 2022). Even invasive species need common names to attract attention, facilitate dialogue with the public, and address the environmental issues they pose (Keiter et al. 2016). Even though regionalism influences common names (see Bennett and Balick 2014), and these names may be insufficient or underappreciated by scientists, there is a need to communicate scientific knowledge with the non-scientific lay population and bring them closer to both the native fauna and the environmental crisis that the planet is going through. Vernacular names can make species more relatable and accessible to non-scientific audiences, compared to the use of Latinized scientific names alone.

In the English scientific literature, popular names of species descriptions are ubiquitous, and nearly all species included in the IUCN Red List include common names in English (IUCN 2022). Several scientific journals do not require the creation of vernacular names when describing a new mammal species, but it seems to be cultural practice to provide common names in English (*Eumops chimaera* Gregorin et al., 2016, Chimera's Bonneted Bat in English – Gregorin et al. 2016), and some include Spanish common names as well (*Mindomys kutuku* Brito, Koch, Tinoco & Pardiñas, 2022, Kutuku rat in English or rata Kutuku in Spanish – Brito et al. 2022). Curiously, the same initiative does not occur in many cases, or most cases, in Brazilian Portuguese even for Brazilian native species.

For rodents, this problem is even more pronounced. They make up the most diverse group of mammals in the world and in Brazil (Burgin et al. 2018, Abreu et al. 2023), most species are small and elusive (Patton et al. 2015), and new species are constantly being described (e.g., Peçanha et al. 2019, Caccavo and Weksler 2021). Allied with this, several species, including native and invasive, are of public health interest (de Freitas et al. 2012, Tavares et al. 2012, Pinto Junior et al. 2014, Costa et al. 2015). However, they are not just diseases reservoirs. Rodents play several important roles in the ecosystem, such as structuring frugivory networks (Carreira et al. 2020), aerating the soil (Witmer and Borrowman 2012), and even pollinating flowers (Biccard and Midgley 2009, Matallana-Puerto and Cardoso 2022). Unfortunately, many of them will disappear even before we fully know the ecosystem services they provide and before we put together adequate conservation plans (Lacher et al. 2020).

Given this scenario, an effort is needed to centralize and make the common/popular names of species publicly available, providing a database to scientists and the non-scientific community. This standardization can lead to easy, direct, and homogeneous communication (Vuilleumier 1999) between science and the general population. The demand for this list is not recent, as articles published over 80 years ago already brought this importance, such as the compendium initiated by Simpson (1941) and Dice's (1937) suggestions.

The purpose of this article is to compile the common names of Brazilian rodent species and correlate them with their respective scientific names, in order to create an organized database while valuing traditional information. We also provide an overview of the groups lacking popular names and those with many different ones. Like Gonzalez et al. (2020), we expect to keep the list constantly updated after new species are described and known names are added. A similar Portuguese version of this paper is provided as Supplementary material S1.

We used as our taxonomic baseline the list of species provided by the Brazilian Society of Mammalogy (Abreu et al. 2023), versions April 2021 and December 2022. There are divergences between the two lists, with some species considered dubious – e.g., *Necromys urichi* (J.A. Allen & Chapman, 1897). We chose to include all species (276) even though those were removed from one of the two lists. See Abreu et al. (2023) for taxonomy comments.

The survey for common/popular/vernacular names was carried out between March 2021 and March 2024. We used books (Dennler 1939, Ihering 1940, Moojen 1952, Carvalho 1979, Sigrist 2012, Patton et al. 2015, Wilson et al. 2016, 2017), field guides (Emmons and Feer 1997, Borges and Tomás 2004, Canevari and Vaccaro 2007, Becker and Dalponte 2013, Brandão and Hingst-Zaher 2021), articles (Brandão et al. 2021, 2022, Caccavo and Weksler 2021, Prado et al. 2021, Saldanha and Rossi 2021, Semedo et al. 2021), Red List compilations (Bergallo et al. 2000, Mikich and Bérnils 2004, Bressan et al. 2009, Tortato and Cremer 2010, Minas Gerais 2010, Rio Grande do Sul 2014, De Fraga et al. 2019) and databases (IUCN 2022). We listed names in Portuguese, Spanish, English, and indigenous languages when available. The complete list of references used for our common names survey is available in the Supplementary material 2 (Table S1). We did not translate any of the available names, and only listed those that explicitly stated "Brazilian/Portuguese common name".

Based on the list of vernacular names structured from the search, we present the descriptive statistics containing

the number of each species' names in each language, the subfamilies with more unique names, which subfamily has more named species, and those with fewer popular names.

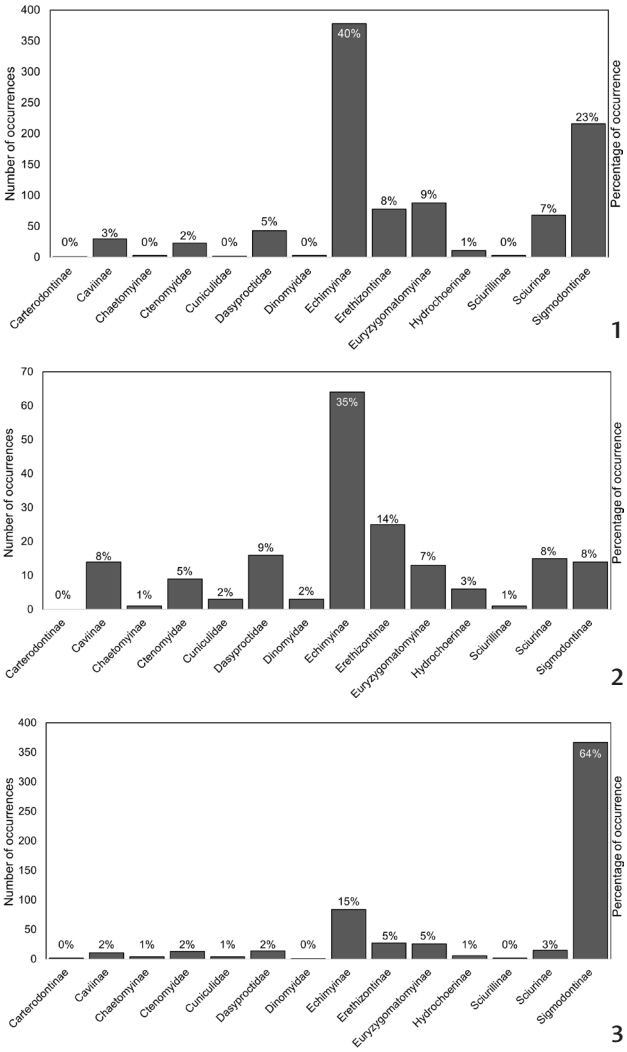
We found common names in Portuguese, Spanish, English, indigenous, or other languages for most species, except for three: *Akodon kadiweu* Brandão, Percequillo, D'Elía, Paresque & Carmignotto, 2021, *Holochilus brasiliensis nanus* Thomas, 1897, and *Oecomys matogrossensis* Saldanha & Rossi, 2021 (Supplementary material 3 Table S2).

Thirty-five out of the 276 species on our list did not have a common name in Portuguese (11.5%). Additionally, we found 142 unique names, although occasional spelling variations accounted for the differences observed (e.g., toro versus toró). However, the same name could be used for several different species (i.e., they were not exclusive). The most common name for wild rodents was "toró," which was used for 66 echimyid species, and "rato-do-mato" was the most common for 57 cricetid species (Fig. 1).

There were 176 vernacular names in Spanish, and according to our literature database, most were exclusive. Exceptions included ardilla, associated with *Hadrosciurus ignitus* (Gray, 1867), *Hadrosciurus igniventris* (Wagner, 1842), and *Hadrosciurus pyrrhinus* (Thomas, 1898); and erizo, referring to *Coendou bicolor* (Tschudi, 1844), *Coendou prehensilis* (Linnaeus, 1758) and *Coendou spinosus* (F. Cuvier, 1823) (Fig. 2). We did not find common Spanish names for 158 species (57%).

We found 570 popular names in English, most of which were exclusive. Exceptions include the "South American water rat" referring to *Nectomys rattus* (Pelzeln, 1883) and *Nectomys squamipes* (Brants, 1827); "Amazonian Marsh rat" referring to *H. brasiliensis nanus* and *H. sciureus*; "Brazilian squirrel" for *Guerlinguetus aestuans* (Linnaeus, 1766) and *Guerlinguetus brasiliensis* (Thomas, 1901); and the "stiff-spined spiny-rat," referring to *Proechimys echinothrix* Da Silva, 1998 and *Proechimys simonsi* Thomas, 1900. The name "hairy-tailed akodont" also referred to different species, but from the different genera (*Necromys* and *Thalpomys*). In total, there were only five species (1.8%) lacking common names (Fig. 3).

The species with the greatest diversity in the number of vernacular names were the squirrels, for all languages. *Guerlinguetus aestuans* presented 23 common names; followed by *G. brasiliensis*, with 19. Regarding English names, the species *C. spinosus*, *Deltamys kempi* Thomas, 1917, *Microsciurus flaviventer* (Gray, 1867), and *Rhipidomys emiliae* (J.A. Allen, 1916) all had five popular names each, the most numerous species in terms of common names. We also found 19 species with vernacular names in other languages,



Figures 1–3. Number and proportion of occurrence of common names for each rodent subfamily: (1) Portuguese; (2) Spanish; (3) English.

from Guaraní to Dutch. However, they were all large and conspicuous species (e.g., squirrels, pacas, and capybaras). Since Simpson (1941), efforts to categorize small myomorph rodents (a group that encompasses Cricetidae rodents) have been hindered, given their similar appearance.

For the 277 species included in our list and known to occur in Brazil (Abreu et al. 2023), virtually all had an English common name associated with them. If a species lacked an English vernacular name, it almost necessarily lacked a corresponding Portuguese and Spanish common name. The observed trend of having fewer common names in Spanish for species occurring in Brazil may be related to

the fact that these species are not familiar, do not occur in other Latin American countries, or that our efforts did not sample enough Spanish-speaking literature.

Most species that lacked common names were small rodents belonging to the Sigmodontinae subfamily. Diurnal species (following Paglia et al. 2012) or those that frequently interact with humans (e.g., "esquilos", *G. aestuans*; "capivaras", *Hydrochoerus hydrochaeris*) or even possess very distinct colors – e.g., "saruê-beju", *Callistomys pictus* (Pictet, 1841) – have various names, which differ depending on the region.

Our sampling for common names is likely to be underrepresented, particularly if we consider that native Brazilians and local people have different names to refer to these rodents. Many of these local language names may not be documented, as numerous languages spoken in the region are primarily oral rather than written (Simpson 1941, iNaturalist – https://www.inaturalist.org/, but see also Superina and Aguiar 2006). We must remember that all Latin America was colonized by European countries, which is why we still have European languages as the main languages in all Latin American countries. This could lead to a bias towards more widely recognized common names in English or other dominant languages, while overlooking the diversity of vernacular names used by indigenous and local communities who have deep, long-standing connections to the native fauna. Such a history of colonization has also led to the creation of several eponyms (naming a species in honor of a person). For recent comments on this matter, see Guedes et al. (2023) and Raposo et al. (2023). For a list of common names and eponyms of mammals, refer to Wilson and Cole (2000) and Beolens et al. (2009). These eponyms are present in our neotropical zoological nomenclature.

The use of the same name for several species may be explained by two non-mutually exclusive reasons: 1) small rodents are morphologically alike (Simpson 1941, Müller et al. 2013), and 2) they are small and elusive, challenging to observe and identify in the wild. As a result, when someone spots one from a distance, they may apply the same common name to refer to multiple, closely related species – a phenomenon known as ethnotaxonomic synonymy (Gonzalez et al. 2020). For snakes, this practice of using the same name for both, poisonous and non-poisonous species may lead to foreseeable accidents (Gonzalez et al. 2020). For rodents, such a problem might not occur, but several rodent species are important disease reservoirs (de Freitas et al. 2012, Tavares et al. 2012, Pinto Junior et al. 2014, Costa et al. 2015), are considered agricultural pests (Stenseth et al. 2003), and may increase their breeding success in response to plantations (e.g., Braga et al. 2020). Therefore, the ability to accurately distinguish between similar species is of crucial public concern.

But rodents are not just pests and nuisances; thus, calling them by the same common name poses risks to the group as a whole. As stated previously, several species provide important ecosystem services. For instance, they can act as seed and spore dispersers, as well as pollinators (Carreira et al. 2020, Stephens and Rowe 2020, Matallana-Puerto and Cardoso 2022), services that can be particularly important in defaunated environments (Galetti et al. 2015). Although rodents are known for causing damage to agricultural production, they can also play a role in controlling other agricultural pests such as weeds and insects, which represent a significant portion of production problems in these systems (Brown et al. 2007, Young et al. 2014, Schäckermann et al. 2015, Tschumi et al. 2018). Moreover, some species are ecosystem engineers, altering the physical environment they inhabit, contributing to the coexistence of other organism species (Jones et al. 1994, Zhang et al. 2003, Zhong et al. 2017, 2022, Lamberto and Leiner 2019, Selden and Putz 2022). Therefore, we can reduce misidentifications and promote awareness of their importance by carefully and accurately naming rodent species. Moreover, building a connection between people and these species using appropriate common names can foster a sense of belonging, leading to increased public engagement in efforts to preserve and conserve rodents and their ecosystems.

What's next?

As future directions, we want to survey the full range of popular names with other Brazilian and South American researchers, and non-academic natives. Following the idea of Superina and Aguiar (2006), we kindly ask our readers to send us common names that they are aware of but were not listed in this survey (regardless of the language): projeto.incisivos@gmail.com.

Moreover, we will send the compiled vernacular names to the IUCN Rodent Specialist Committee. We also appeal to taxonomists describing new species to propose a common name in their host country language, such as Portuguese for species described in Brazil, following Brandão et al. (2021) and Prado et al. (2021), for instance.

Ultimately, we, together with the scientific and non-scientific community, would like to propose new common names as our next step for those species lacking one. Some of our peers have complained about this initiative, but the scientific Latin names are unlikely to be used in everyday conversations. Previous researchers, such as Dice (1937)

and Simpson (1941), have suggested that effective common names should be short, objective, and refer to the species' characteristics or habits. We believe that this list can serve as a starting point for creating a standardized methodology for popular nomenclature in Brazilian Portuguese, while also serving as a basis for a broader discussion with members of the academic and non-academic communities encompassing different criteria for such a methodology.

We recognize that numerous rodent species, especially small sigmodontine rodents, are highly similar and challenging to differentiate in the field (see Bonvicino et al. 2008, Wilson et al. 2017). Thus, having a common name for each species may not be readily applicable to field identification. We can counter-argue that even large mammal species in South America are frequently being split into multiple distinct species based on genetic and morphological differences (e.g., Ruedas et al. 2019 splitting the cotton-tailed *Sylvilagus* into multiple species), impending spot-on identification efforts, especially when at the outmost edge of geographic distributions of species.

Citing the iNaturalist website, "Common names change from place to place, and scientific names change from time to time" but popular names are necessary. Popular names are crucial for scientific communication and raising awareness. The availability of common names can be a vital tool for engaging the general public in biodiversity conservation. Given the ecosystem services rodents provide and their recognized importance as disease reservoirs and agricultural pests, we emphasize the significance of popular knowledge about this group of animals.

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GS: leading conceptualization, data curation, formal analysis, investigation, methodology, project administration, visualization, writing – original draft, writing – review and editing. HF, PF, FSG, FHM, CPRF, JGA and LLC: supporting conceptualization, data curation, formal analysis, investigation, methodology, project administration, visualization, writing – original draft, writing – review and editing.

Competing Interests

The authors have declared that no competing interests exist.

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Supplementary material 1
Supplementary File S1. A similar Portuguese version of this paper.

Authors: Sobral G, Ferreira H, Ferracioli P, Souza-Gudinho F, Menezes FH, Ferrando CPR, de Albuquerque JG, Luchesi LC.

Data type: Portuguese version.

Supplementary material 2
Table S1. List of references used in the common names survey.
Authors: Sobral G, Ferreira H, Ferracioli P, Souza-Gudinho F, Menezes FH, Ferrando CPR, de Albuquerque JG, Luchesi LC.
Data type: Species data.

Supplementary material 3
Table S2. Common names in Portuguese, Spanish, English, indigenous, and other languages with a reference number.
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Data type: Species data.