ATLANTIC MAMMAL TRAITS: A dataset of morphological traits of mammals in the Atlantic Forest of South America

Fernando Gonçalves[1*], Ricardo S. Bovendorp[1], Gabrielle Beca[1], Carolina Bello[1], Raul Costa-Pereira[1], Renata L. Muylaert[1], Raisa R. Rodarte[1], Nacho Villar[1], Rafael Souza[1], Maurício E. Graipel[2], Jorge J. Cherem[3], Deborah Faria[4,5], Julio Baumgarten[4], Martín R. Alvarez[5], Emerson M. Vieira[6], Nilton Cáceres[7], Renata Pardini[8], Yuri L. R. Leite[9], Leonora Pires Costa[9], Marco Aurelio Ribeiro Mello[10], Erich Fischer[11], Fernando C. Passos[12], Luiz H. Varzinczak[13], Jayme A. Prevedello[14], Ariovaldo P. Cruz-Neto[15], Fernando Carvalho[16], Alexandre R. Percequillo[17], Agustin Paviolo[18,19], Alessandra Nava[20], José M. B. Duarte[21], Noé U. de la Sancha[22,47], Enrico Bernard[23], Ronaldo G. Morato[24], Juliana F. Ribeiro[6], Rafael G. Becker[25], Gabriela Paise[26], Paulo S. Tomasi[25], Felipe Vélez-Garcia[4,5], Geruza L. Melo[7], Jonas Sponchiado[7], Felipe Cerezer[7], Marília A. S. Barros[23], Albérico Queiroz Salgueiro de Souza[4,5], Cinthya Chiva dos Santos[4], Gastón Andrés Fernandez Giné[4], Patricia Kerches-Rogeri[1], Marcelo M. Weber[27], Guilherme Ambar[15], Lucía V. Cabrera-Martinez[15], Alan Eriksson[15,28], Maurício Silveira[28], Carolina F. Santos[28], Lucas Alves[28], Eder Barbier[23], Gabriela C. Rezende[15,29], Guilherme S. T. Garbino[30], Élson O. Rios[5], Adna Silva[5], Alexandre Túlio Amaral Nascimento[31], Rodrigo Salles de Carvalho[32], Anderson Feijó[33], Juan Arrabal[19,34], Ilaria Agostini[18,19], Daniela Lamattina[34], Sebastian Costa[34], Ezequiel Vanderhoeven[34], Fabiano R. de Melo[35,36], Plautino de Oliveira Laroque[37], Leandro Jerusalinsky[37], Mônica Mafra Valença-Montenegro[37], Amely Branquinho Martins[37], Gabriela Ludwig[37], Renata Bocorny de Azevedo[37], Agustin Anzóategui[38,39], Marina Xavier da Silva[40], Marcela Figuerêdo Duarte Moraes[41], Alexandre Vogliotti[42], Andressa Gatti[9], Thomas Püttker[43], Camila S. Barros[27], Thais Kubik Martins[44], Alexine Keuroghlian[45], Donald P. Eaton[46], Carolina L. Neves[1], Marcelo S. Nardi[1], Caryne Braga[48], Pablo Rodrigues Gonçalves[48], Ana Carolina Srbek-Araujo[49], Poliana Mendes[49], João Alves de Oliveira[50], Fábio Angelo Melo Soares[4,51], Patrício A. Rocha[52], Peter Crawshaw Jr[24], Milton Cezar Ribeiro[1] and Mauro Galetti[1*]

[1] Instituto de Biociências, Departamento de Ecologia, Universidade Estadual Paulista (UNESP), 13506-900 Rio Claro, SP, Brasil
[2]Universidade Federal de Santa Catarina, Centro de Ciências Biológicas, Departamento de Ecologia e Zoologia, Florianópolis, SC, Brasil
[3]Caipora Cooperativa, Florianópolis, SC, Brasil
[4]Laboratório de Ecologia Aplicada à Conservação, Programa de Pós-graduação em Ecologia e Conservação da Biodiversidade, Universidade Estadual de Santa Cruz, Ilhéus, BA, Brasil
[5]Universidade Estadual de Santa Cruz, Coleção de Mamíferos "Alexandre Rodrigues Ferreira" (CMARF-UESC)
[6]Laboratório de Ecologia de Vertebrados, Instituto de Ciências Biológicas, Departamento de Ecologia, Universidade de Brasília, Brasil
[7]Departamento de Ecologia e Evolução, Universidade Federal de Santa Maria. Santa Maria, RS, Brasil
[8]Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, Brasil
[9]Departamento de Ciências Biológicas, Centro de Ciências Humanas e Naturais, Universidade Federal do Espírito Santo, Vitória, ES, Brasil
[10]Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brasil
[11]Instituto de Biociências, Universidade Federal de Mato Grosso de Sul, Campo Grande, MS, Brasil
[12]Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Paraná, Brasil
[13]Programa de Pós-Graduação em Ecologia e Conservação, Universidade Federal do Paraná, Curitiba, PR, Brasil
[14]Departamento de Ecologia, Universidade do Estado do Rio de Janeiro, Rio de Janeiro, RJ, Brasil
[15]Departamento de Zoologia, Universidade Estadual Paulista (UNESP), Instituto de Biociências, Rio Claro, SP, Brasil
[16]Universidade do Extremo Sul Catarinense, Programa de Pós-Graduação em Ciências Ambientais, Criciúma, SC, Brasil
[17]Departamento de Ciências Biológicas, Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ), Universidade de São Paulo, Piracicaba, SP, Brasil
[18]CONICET, Universidad Nacional de Misiones, Instituto de Biología Subtropical, Puerto Iguazú, Misiones, Argentina
[19]Asociación Civil Centro de Investigaciones del Bosque Atlántico, Puerto Iguazú, Misiones, Argentina
[20]Instituto Lêonidas e Maria Deane- FIOCRUZ Amazônia, Manaus, AM, Brasil
[21] Departamento de Zootecnia, Universidade Estadual Paulista (UNESP), Jaboticabal, SP, Brasil

[22]Integrative Research Center, The Field Museum of Natural History, Chicago, IL, USA
[23]Laboratório de Ciência Aplicada à Conservação da Biodiversidade, Departamento de Zoologia, Centro de Biociências, Universidade Federal de Pernambuco, Recife, PE, Brasil
[24]Centro Nacional de Pesquisa e Conservação de Mamíferos Carnívoros, Instituto Chico Mendes de Conservação da Biodiversidade, Atibaia, São Paulo, Brasil
[25]Univerdade do Vale do Rio dos Sinos, São Leopoldo, RS, Brasil
[26]Laboratório de Ecologia de Mamíferos, Departamento de Biologia. Universidade Regional do Cariri, Crato, CE, Brasil
[27]Universidade Federal do Rio de Janeiro, Departamento de Ecologia, Laboratório de Vertebrados, Rio de Janeiro, RJ, Brasil
[28]Programa de Pós-Graduação em Ecologia e Conservação, Universidade Federal de Mato Grosso do Sul. Campo Grande, MS, Brasil
[29]IPÊ - Instituto de Pesquisas Ecológicas, Nazaré Paulista, SP, Brasil
[30]Universidade Federal de Minas Gerais, Programa de Pós-Graduação em Zoologia, Belo Horizonte, MG, Brasil
[31] Universidade do Estado de Minas Gerais, Departamento de Ciências Biológicas, Ibirité, MG, Brasil
[32]PREA - Programa de Educação Ambiental, Juiz de Fora, MG, Brasil
[33]Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, Beijing, China
[34]Instituto Nacional de Medicina Tropical (INMeT), Ministerio de Salud de la Nación, Puerto Iguazú, Misiones, Argentina
[35]Departamento de Engenharia Florestal, Universidade Federal de Viçosa. Viçosa, MG, Brasil
[36]Instituto de Biociências, Universidade Federal de Goiás, Jataí, GO, Brasil
[37]Centro Nacional de Pesquisa e Conservação de Primatas Brasileiros - CPB, Instituto Chico Mendes de Conservação da Biodiversidade - ICMBio. João Pessoa, PB, Brasil
[38]Centro de Rescate de Fauna Silvestre Guira Oga, Puerto Iguazu, Argentina
[39]Fundación de Historia Natural Felix de Azara, Ciudad Autonoma de Buenos Aires, Argentina
[40]Projeto Carnívoros do Iguaçu, Foz do Iguaçu, PR, Brasil
[41] Faculdade de Ciências Agrárias e Veterinárias de Jaboticabal, Departamento de Medicina Veterinária Preventiva e Reprodução Animal, Universidade Estadual Paulista, Jaboticabal, SP, Brasil
[42]Universidade Federal da Integração Latino-Americana, Instituto Latino-Americano de Ciências da Vida e da Natureza, Foz do Iguaçu, PR - Brasil
[43]Departamento de Ciências Ambientais, Universidade Federal de São Paulo, Diadema, SP, Brasil
[44]Laboratório de Mamíferos, Departamento de Sistemática e Ecologia, Universidade Federal da Paraíba, João Pessoa, PB, Brasil
[45]IUCN Peccary Specialist Group, Campo Grande, MS, Brasil
[46]WWF Brazil, Pantanal/Cerrado, Campo Grande, MS, Brasil
[47]Department of Biological Sciences, Chicago State University, Chicago IL, USA
[48]Universidade Federal do Rio de Janeiro, Núcleo em Ecologia e Desenvolvimento Socioambiental de Macaé. Macaé, RJ, Brasil
[49]Programa de Pós-graduação em Ecologia de Ecossistemas, Universidade Vila Velha, Vila Velha, ES, Brasil
[50]Universidade Federal do Rio de Janeiro, Museu Nacional, Departamento de Vertebrados, Rio de Janeiro, RJ Brasil
[51]Universidade Federal da Bahia, Programa de Pós-Graduação em Ecologia, Salvador, BA, Brasil
[52]Laboratório de Mamíferos, Programa de Pós-Graduação em Ciências Biológicas (Zoologia), Departamento de Sistemática e Ecologia, Universidade Federal da Paraíba, João Pessoa, PB, Brasil

* Correspondence and requests for materials should be addressed to Fernando Gonçalves (fhmgoncalves@hotmail.com) and Mauro Galetti (email: mgaletti@rc.unesp.br).

Introduction

One of the major conceptual shifts in modern community ecology is the use of functional traits to describe diversity patterns. Some authors have suggested a 'rebuilt in community ecology from functional traits', by shifting the traditional focus of ecological studies from species (i.e. taxonomic identity) to functional traits these species possess (McGill et al. 2006). Indeed, there has been an increasing interest in understanding how functional traits at the species level explain macroecological patterns (Kissling et al. 2014, Pacifici et al. 2015, Galetti et al. 2017). However, there is a large amount of trait variation within species and it is increasingly apparent that it is important to consider trait-variation not only between species, but also within-species (Bolnick et al. 2002, Violle et al. 2012)., Mammals are an interesting group to be studied by trait-based approaches in order to gain mechanistic and functional insights into biological diversity. For example, mammals play diverse important ecological functions (e.g. pollination, seed dispersal, predation, grazing) that are correlated with functional traits (Safi et al. 2011, Diaz et al. 2013). Although there are several compelling datasets on the morphological traits at the species level for mammals (Geiser 1998, Jetz et al. 2009, Jones et al. 2009, Wilman et al. 2014, Belmaker and Jetz 2015), there is little information available documenting trait values at the individual level (Bolnick et al. 2011, Moran et al. 2016, Mimura et al. 2017).

Individual variation provides the raw material for natural selection and, thus, is a key focus of evolutionary theory (Bolnick et al. 2011). Trait variation among conspecific individuals underpins classic works in ecological genetics (Ford 1964) and niche evolution (Roughgarden 1972). Indeed, individual variation in mammal species is ubiquitous and can have important ecological consequences, such as changing adaptive speciation rates, and promoting intrapopulation diversity (Estes et al. 2003, Mann et al. 2008, Thiault et al. 2017). Therefore, more than portraying mammal species through mean trait-values, it is important to account for trait variation within species, which has the potential to enhance our understanding of ecological processes (Violle et al. 2012). Information of individual variation is also particularly relevant because human activities, including size selective harvesting and climate change, can select for important traits that affect survival rate (Darimont et al. 2003, Estes et al. 2003, Faurby and Araújo 2017, Gonçalves et al. 2017).

One of the regions with the highest diversity and endemisms of mammals worldwide is the Atlantic forest of South America (Galindo-Leal and Câmara 2003). The Atlantic forest was one of the largest south American rainforests, originally covering around 150 million hectares along the Brazilian coast. Intensive forest clearing reduced its original area to thousands of small fragments, accounting for around 12% of its original area (Ribeiro et al. 2009). The remaining forest hosts a larger number of endemic species and is considered one of the five major hotspots of biodiversity (Myers et al. 2000, Visconti et al. 2011).

The Atlantic forest is probably the tropical rainforest biome where we have most information on biodiversity available, particularly on vertebrates (Bello et al. 2017, Bovendorp et al. 2017b, Lima et al. 2017, Muylaert et al. 2017) and plants (de Lima et al. 2015). However, to understand how local ecological communities and regional patterns of biodiversity are structured, a comprehensive dataset on morphological and life history traits is still needed, preferentially at the individual level.

Here we compiled a dataset of morphological traits and life history of 279 mammal species from 39,850 individuals that occur in the Atlantic forest of Brazil, Argentina and Paraguay (Figure 1). The dataset ATLANTIC MAMMAL TRAITS represents the largest dataset of morphological information at species and individual levels for Neotropical mammals (Figure 2).

METADATA

CLASS I. DATA SET DESCRIPTORS

A. Data set identity:

Title: ATLANTIC MAMMAL TRAITS: a dataset of morphological traits of mammals from the Atlantic Forest of South America

B. Data set and metadata identification codes:

Suggested Data Set Identity Codes: ATLANTIC-TR_all_data.csv, ATLANTIC-TR_means_traits

C. Data set description

Principal Investigators:

1. Fernando Gonçalves and Mauro Galetti

Instituto de Biociências, Departamento de Ecologia, Universidade Estadual Paulista (UNESP), CP. 199, Rio Claro, São Paulo, 13506-900, Brasil

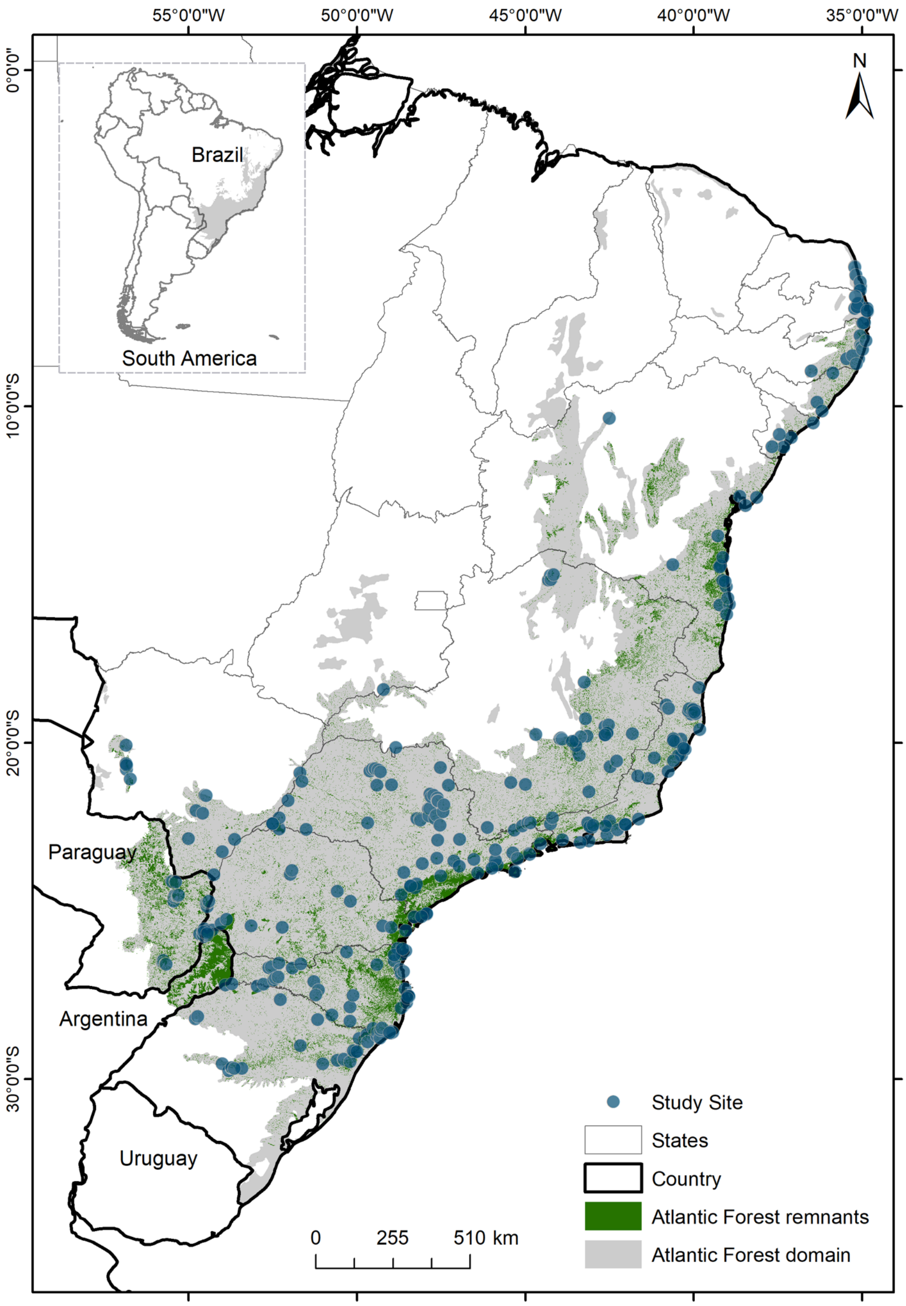

Figure 1. Volant and non-volant mammlas sampled in the Atlantic forest. Gray shows the historic distribution of the Atlantic forest with remaining in green.

Abstract: Measures of traits are the basis of functional biological diversity. Numerous works consider mean species-level measures of traits whilst ignoring individual variance within species. However, there is a large amount of variation within species and it is increasingly apparent that it is important to consider trait-variation not only between species, but also within-species. Mammals are an interesting group for investigating trait-based approaches

because they play diverse and important ecological functions (e.g. pollination, seed dispersal, predation, grazing) that are correlated with functional traits. Here we compile a dataset comprising morphological and life history information of 279 mammal species from 39,850 individuals of 388 populations ranging from -5.83 to -29.75 of latitude (decimal degrees) and -34.82 to -56.73 of longitude in the Atlantic forest of South America. We present trait information from 16,840 individuals of 181 species of non-volant mammals (Rodentia, Didelphimorphia, Carnivora, Primates, Cingulata, Artiodactyla, Pilosa, Lagomorpha, Perissodactyla) and from 23,010 individuals of 98 species of volant mammals (Chiroptera). The traits reported include body mass, age, sex, reproductive stage, as well as the geographic coordinates of sampling for all taxa. Moreover, we gathered information on forearm length for bats and body length and tail length for rodents and marsupials.

D. Key words: Mammalia, biodiversity hotspot, inventories, functional diversity, body mass, individual variation, forest fragmentation, biogeographic region, Rainforests, geographic range, individual based, interspecific variation.

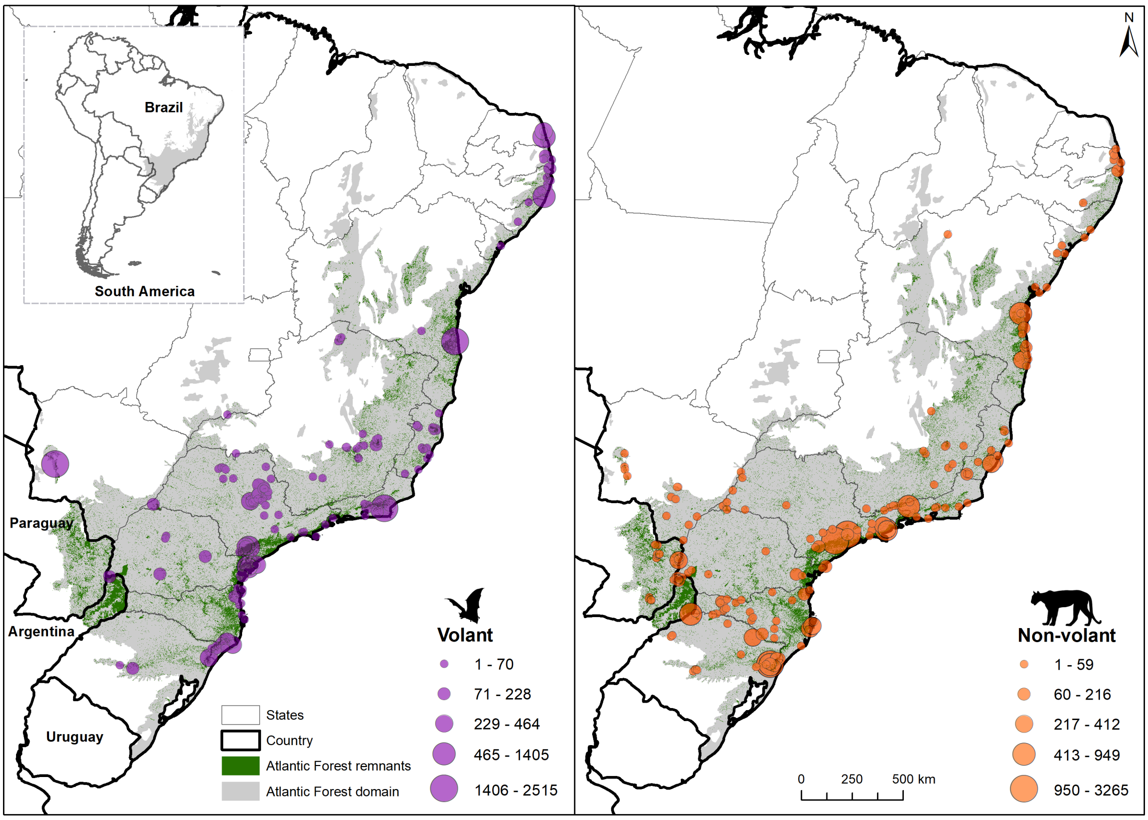

Figure 2. Distribution of the populations of volant (left) and non-volant (right) species surveyed. The size of the circles indicate the number of individuals sampled from every population. Gray shows the historic distribution of the Atlantic forest, with remaining forest patches in green.

Description

The datasets were collected in the domain of the Atlantic forest that covers tropical and subtropical forests in Brazil, Paraguay and Argentina (Ribeiro et al. 2009, Morrone 2014). We report the information about body mass, age, sex, reproductive stage, status and geographic coordinates for all taxa. In addition, information about forearm length for bats and body length and tail length for rodents and marsupials from 39,850 individuals, representing 279 species of mammals that were directly measured from surveys along a gradient of -5.83 to -29.75 of latitude (decimal degrees) and -34,82 to -56.73 of longitude. We used only adult individuals and non-pregnant females to calculate the means shown in Table 5 (ATLANTIC-TR_means.csv). Most of the studies were carried out in semidecidous forests (45,5%), which are the dominant vegetation type of the Atlantic forest (Oliveira-Filho and Fontes 2000). We provide information from 388 populations inhabiting forest patches varying from 0.15 to 791,652 ha (average = 11,886 ha, median = 390 ha). The dataset comprises 12,920 individuals of 95 species of Rodentia; 2,699 individuals of 28 species of Didelphimorphia; 628 individuals of 21 species of Carnivora; 345 individuals of 19 species of Primates; 21 individuals of five species of Cingulata; 145 individuals of six species of Artiodactyla; 62 individuals of four species of Pilosa; 14 individuals of two species of Lagomorpha; 6 individuals of one species of Perissodactyla, and 23,010 individuals of 98 species of Chiroptera (Table 1).

The Chiroptera, Rodentia and Didelphimorphia were the orders with the smallest body mass, with most species representing less than 1,000 grams and five orders had most of the species with more than 1,000 grams (Perissodactyla, Artiodactyla, Carnivora, Cingulata and Pilosa). The orders with similar means of body mass were: (1) Primates and Lagomorpha, and (2) Carnivora, Cingulata and Pilosa (Figure 3). Volant mammals

Order Chiroptera

We present information on 98 species (86.7% of the known species) of bats that occur in the Atlantic forest (Table 2) distributed in four vegetation types (Table 3). *Carollia perspicillata* (6,374 individuals, 47 populations) was the volant species with the most morphological information, followed by *Sturnira lilium* (3,155 individuals, 50 populations) and *Artibeus planirostris* (2,647 individuals; 17 populations). *Phyllostomus hastatus* was the species with the largest body mass (mean 98.34 g; SD = 15.99; N = 82; 14 populations) and largest forearm (mean 87.56 mm; SD = 3.29; N = 82; 14 populations) and *Myotis lavali* was the species with the largest coefficient of variation for the body mass (0.48 g; N = 427; 3 populations). In addition, *Furipterus horrens* was the species with the smallest body mass (mean 4 g; SD = 0.58; N = 7; 1 population) and *Molossops temminckii* was the species with the smallest forearm (mean 30.86 mm; SD = 1.08; N = 6; 2 population). We had measures from just one individual for 11 species (*Peropteryx leucoptera, Promops nasutus, Centronycteris maximiliani, Diaemus youngii, Dryadonycteris capixaba, Lichonycteris obscura, Lonchophylla bokermanni, Histiotus montanus, Thyroptera wynneae*, *Dermanura anderseni* and *Lasiurus ega*).

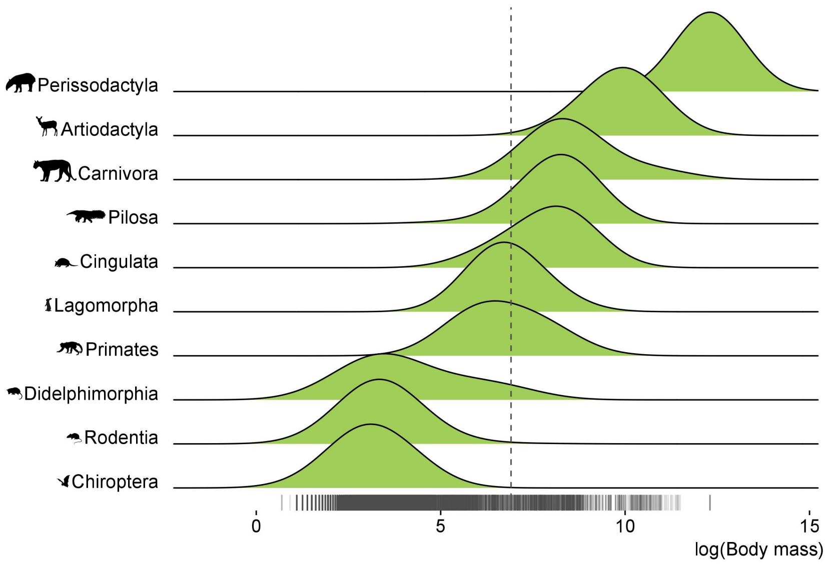

Figure 3. Distribution of mammalian body mass (log-transformed for each taxonomic Order from the Atlantic forest of South America. Distributions were obtained from individual-level measurements of body mass (g). The dashed line represents 1000 g.

<u>Non-volant Mammals</u>

Order Rodentia

We present information on 95 species (96.9 % of the known species) of rodents that occur in the Atlantic forest (Table 2). These are distributed in four vegetation types (Table 3) and included three invasive species (*Rattus rattus, Rattus norvergicus* and *Mus musculus*). The montane grass mouse *Akodon montensis* was the species with more individuals measured (3,454 individuals; 25 populations), followed by *Oligoryzomys nigripes* (2,464 individuals; 30 populations). Capybaras, *Hydrochoerus hydrochaeris* was the species with the largest body mass (mean 17,450 g; SD = 0.92; N = 5; 2 populations) and largest coefficient of variation for the body mass (0.63; N = 5; 2 populations). *Kannabateomys amblyonyx* was the species with the largest tail length (mean 323 mm; SD = 18.55; N =3; 2 populations) and *Cavia intermedia* was the species with the largest body length (mean 274.81 mm; SD = 35.39; N = 16; 1 population). In addition, *Oligoryzomys mattogrossae* was the species with the smallest body mass (mean 11.70 g; SD = 3.97; N = 7; 3 populations), the invasive *M. musculus* was the species with the smallest body length (mean 73.8 mm; SD = 9.6; N = 20; 4 populations) and *Blarinomys breviceps* was the species with the smallest tail length (mean 53.95 mm; SD = 16.84; N = 27; 8 populations). We had measures from just one individual for 14 species (*Dasyprocta iacki, Rhagomys rufescens, Cerradomys maracajuensis, Ctenomys minutus, Nectomys rattus, Phaenomys ferrugineus, Phyllomys dasythrix, Phyllomys blainvilii, Phyllomys lamarum, Phyllomys lundi, Phyllomys mantiqueirensis, R. norvegicus, Thrichomys laurentius and Thrichomys pachyurus, Rhagomys rufescens*).

Order Didelphimorphia

We present information from 28 species (100% of the known species) and from an additional 6 species that occur in the Atlantic forest (Table 2). This addition is the consequence of recent descriptions of new species of opossums (Pavan et al. 2017) and the inclusion of species from Atlantic forest of Paraguay and Argentina, regions that were not included in the Paglia et al. (2012) reference review. *Marmosops incanus* was the species with more individuals measured (549 individuals; 63 populations), followed by *Didelphis aurita* (457 individuals; 40 populations). *Didelphis albiventris* was the species with the largest body mass (mean 752.77 g; SD = 571.56; N = 96; 17 populations), and *D. aurita* was the species with the largest tail length (mean 313.02 mm; SD = 78.93; N = 457; 40 populations) and largest body length (mean 300.25 mm; SD = 73.93; N = 457; 40 populations). *Monodelphis dimidiata* was the species with the largest coefficient of variation for the body mass (0.89; N = 29; 2 populations). In addition, *Cryptonanus agricolai* was the species with the smallest body mass (mean 9.33 g; SD=3.21; N=3; 3 populations), smallest body length (mean 75.47 mm; SD = 10.15; N = 3; 3 populations) and *Monodelphis macae* was the species with the smallest tail length (mean 45.5 mm; SD = 3.94; N= 25; 3 populations).

Order Carnivora

We present information on 21 species (100 % of the known species) of carnivores that occur in the Atlantic forest and additional information on maned wolf *Chrysocyon* *brachyurus*. The South American coati, *Nasua nasua* (264 individuals; 39 populations) was the species with more individuals measured of Carnivora, followed by the crab-eating fox, *Cerdocyon thous* (78 individuals; 49 populations) and the puma, *Puma concolor* (40 individuals; 27 populations). The jaguar, *Panthera onca* was the species with the largest body mass (mean 63,203 g; SD = 19,066; N = 32; 17 populations) and the neotropical otter, *Lontra longicaudis* was the species with largest coefficient of variation for the body mass (1.44; N = 10; 4 populations).

Order Primates

We present information on 19 species (79,1% of the known species) of monkeys and tamarins that occur in the Atlantic forest (Table 2). The blonde capuchin monkey, *Sapajus flavius* was the primate species with more individuals measured (61 individuals; 2 populations), followed by the black lion tamarin, *Leontopithecus chrysopygus* (47 individuals; 4 populations) and white-tufted-ear marmoset, *Callithrix jacchus* (35 individuals; 3 populations). Southern Muriqui, *Brachyteles arachnoides* was the species with the largest body mass (10,200 g), and the northern muriqui, *Brachyteles hypoxanthus* was the species with the largest coefficient of variation for the body mass (0.42; N=13; 4 populations). In addition, the black-pencilled marmoset *Callithrix penicillata* was the species with the smallest body mass (mean 307.62 g; N = 21; 4 populations). The masked titi monkey *Callicebus personatus,* and golden lion tamarin *L. chrysomelas* were the species with fewer individuals measured (one individual each).

Order Cingulata

We present information on 4 species (57,14% of the known species) of armadillos that occur in the Atlantic forest (Table 2). The species of Cingulata with more individuals measured was the nine-banded armadillo, *Dasypus novemcinctus* (11 individuals; 6 populations), followed by the greater naked-tailed armadillo, *Cabassous tatouay* (4 individuals; 2 populations) and the brazilian lesser long-nosed armadillo, *Dasypus septemcinctus* (3 individuals; 2 populations). *C. tatouay* was the species with the largest body mass (mean 5.175 g; SD = 850; N = 4; 2 populations) and *D. novemcinctus* was the species with the largest coefficient of variation for the body mass (0.54; N = 11 individuals; 6 populations).

Order Artiodactyla and Perissodactyla

We present information on 6 species of Artiodacyla and 1 species of Perissodactyla (100% of the known species) that occur in the Atlantic forest. The species of Artiodactyla with more individuals measured was the white-lipped peccary, *Tayassu pecari* (85 individuals; 5 populations), followed by the collared peccary, *Pecari tajacu* (46 individuals; 3 populations). The red brocket, *Mazama americana*, was the species with the largest body mass (mean 30,333 g; SD= 8326; N = 3; 1 population) and the *P. tajacu*, was the species with the largest coefficient of variation for the body mass (0.39; N = 3, 3 populations). Among Perissodactyla, six individuals of lowland tapir, *Tapirus terrestris* were measured in only two populations and the mean body mass was 220,000 g.

Order Pilosa

We present information on 4 species (80% of the known species) of sloths and ant-eaters that occur in the Atlantic forest (Table 2). The species of Pilosa with more individuals measured was the maned three-toed sloth, *Bradypus torquatus* (25 individuals; 5 populations), followed by the collared anteater, *Tamandua tetradactyla* (24 individuals; 7 populations) and the brown-throated sloth, *Bradypus variegatus* (12 individuals; 3 populations). *B. torquatus* also was the species with the largest body mass (mean 5984.76 g; SD = 7973; N = 25; 5 populations) and also was the species with the largest coefficient of variation for the body mass (1.3; N = 25; 5 populations). The silk anteater, *Cyclopes didactylus,* had only one individual measured. We did not have trait information for the giant anteater (*Myrmecophaga tridactyla*) occurring in the Atlantic forest.

Order Lagomorpha

We present information on 2 species (100% of the known species) of rabbit that occur in the Atlantic forest, including one invasive species (*Lepus europaeus*) (Table 2). *Sylvilagus brasiliensis* showed the largest body mass (mean 628.58 g; SD = 322.81; N = 12; 6 populations) and largest coefficient of variation for the body mass (0.51; N = 12; 6 populations).

CLASS II. RESEARCH ORIGIN DESCRIPTORS

A. Overall project description

Identity: A compilation of morphological information at species and individual level of mammals from the Atlantic forest of Brazil, Argentina and Paraguay.

Period of Study: 1940 to 2017.

Objectives: Our objectives for compiling the data were: (1) to summarize information about individual- and species-level morphological variation of mammals in Atlantic forest. This information will provide more detailed information on the variation of functional traits of species and individuals in a single biome. Our dataset represents a first attempt to obtain large-scale trait information at the individual level on mammals, with potential applications in the study of intraspecific variability (Estes et al. 2011, Araujo and Costa-Pereira 2013), community assembly (Violle et al. 2012), the influence of anthropogenic impacts on morphological traits (Faurby and Araújo 2017) and in macroecological studies (Pacifici et al. 2017).

Abstract: Same as above.

Sources of funding: The compilation of this data set was supported by grants and scholarships from Programa BIOTA from São Paulo Research Foundation (FAPESP), Coordination of Superior Level Staff Improvement (CAPES), Brazilian Research Council (CNPq), Espírito Santo Research and Innovation Support Foundation (FAPES), National Geographic Society (NGS), World Wildlife Fund (WWF), German Federal Ministry of Education and Research (BMBF), Fundação de Apoio ao Desenvolvimento do Ensino, Ciência e Tecnologia do Estado de Mato Grosso do Sul (FUNDECT), Disney Conservation Fund, Durrell Wildlife Conservation Trust, FUNBIO, Idea Wild, Lion Tamarins of Brazil Fund, Primate Action Fund/CI, Whitley Fund for Nature.

B. Specific subproject description

Site description: The Atlantic forest is an important biodiversity hotspot in South America and supports up to 8% of the world's total species richness and one of the highest rates of endemism in the world (Myers et al. 2000). The Atlantic forest is originally distributed in the tropical and subtropical coast of Brazil and in the countryside of Argentina and Paraguay (Olson et al. 2001) and comprises tropical and subtropical evergreen and semideciduous forests with highly heterogeneous environmental conditions (Morellato and Haddad 2000). The Atlantic forest supports at least 15,519 plant species (3,343 trees) (BFG 2015), 891 bird species (Moreira-Lima 2014), 543 amphibians (Haddad et al. 2013), 200 reptiles (Bérnils and Costa 2015), 350 fishes (MMA 2010), and >298 mammals (Paglia et al. 2012).

From all mammals, there are 98 species of Rodentia, 22 species of Didelphimorphia, 20 species of Carnivora, 23 species of Primates, seven species of Cingulata, six species of Artiodactyla, five species of Pilosa, one species of Lagomorpha, one species of Perissodactyla, and 113 species of Chiroptera (Table 2). At least seven invasive mammal species are widespread in the Atlantic forest: the domestic dog (*Canis lupus familiaris*), domestic cat (*Felis silvestris catus*) (Lima et al. 2017), feral pigs (*Sus scrofa*) (Pedrosa et al. 2015), European hare (*L. europaeus*) (Auricchio and Olmos 1999), and the rodents *M. musculus, R. norvergicus* and *R. rattus* (Bovendorp et al. 2017b).

Seventy two percent of the Brazilian population live in areas of the Atlantic forest domain (~145 million people), where the most populated cities in South America are located, São Paulo and Rio de Janeiro (IBGE 2013). Therefore, many past and present anthropogenic activities such as logging, sugarcane and coffee plantations, agribusiness, livestock, mining, industrialization and unplanned urban expansion have contributed to the deterioration of this biome. At this stage, the conservation of Atlantic forest is critical, since the natural remnants left account for only 12% of the original biome area, more than 80% of these remnants are < 50 ha (Ribeiro et al. 2009), and almost 90% of the fragments are defaunated of large mammals (Jorge et al. 2013).

Data compilation: Data was obtained from raw data from unpublished and published information. We searched for potential studies in the following sources: (i) online academic databases (e.g., ISI Web of Knowledge, Google Academic, Scielo, Scopus, JStore) (ii) digital libraries of Brazilian universities, (iii) references cited in literature, and after that we emailed the researchers to contribute with the raw data. The searches were performed with the following key words: small mammal(s), bats, medium to large mammal(s) survey(s), inventory(ies), body mass, and Atlantic forest. The literature search was conducted in English, Portuguese and Spanish.

Research Methods: ATLANTIC MAMMAL TRAITS: a dataset of morphological traits of mammals from the Atlantic Forest of South America, includes information on some morphological traits and reproductive data; body mass (in grams), age (adult, juvenile), sex (male, female), reproductive stage (female = pregnant or NA, male = scrotal or NA), status (alive or dead) of the individual when measured and geographic coordinates of sampling sites for all taxa and additionally information about forearm for bats and body length and tail length for small rodents and marsupials (all in millimeters). We classified as volant mammals the species belonging to the order Chiroptera and non-volant mammals species belonging to the order Pilosa, Cingulata, Perissodactyla, Artiodactyla, Carnivora, Lagomorpha, Rodentia, Didelphimorphia, and Primates. Cells with lack of information were filled with NA.

Taxonomic data: We used animal taxonomic information for marsupials according to Voss and Jansa (2009) and for the rodent species we used Patton et al. (2015). We followed Wilson and Reeder (2005) for the taxonomic classification of medium to large mammal species surveyed, except for the genus *Leopardus* for which we followed Nascimento and Feijó (2017). Taxonomy of bats follows Gardner (2008) with the same exceptions as in ATLANTIC BATS (Muylaert et al. 2017). Primates were classified according to Rylands and Mittermeier (2014).

C. Data Limitations and Potential Enhancements

Sampling different mammalian species must rely on several different methods (Voss and Emmons 1996), and commonly sampling completeness is not achieved in inventories. Large bodied species are more difficult to capture, and measure (e.g. tapir, peccaries, and primates), and some species are too rare (e.g. bush dog, silk anteater) or poorly sampled (e.g. armadillos, paca, agoutis) for unknown reasons. Some species occur in a small range of the Atlantic forest (e.g. giant ant-eater and giant armadillo). Most of the individuals in our dataset (75%) are from species that are more easily captured and handled, as small mammals and bats with body mass less than 1 kg (Bovendorp et al. 2017a, Trevelin et al. 2017), although some of them may be uncommonly trapped (e.g. arboreal rodents).

We understand that biometric data that relies on consistent measurements may incur inherent errors among observers (Palmeirim 1998). Measurement error is usually larger in alive individuals and for specific traits (e.g. rodent hind foot, bat forearm) (Blackwell et al. 2006). The ideal is for each observer to replicate the measurements for each trait, particularly the ones that use calipers. Blackwell et al. (2006) quantified the magnitude of intra- and inter-observer error for many studies with Australian small-mammal species; they recognized that such errors did not significantly change the overall results. Here we did not consider measurements errors, but provide raw data filtered for outliers.

Our dataset provides information for about 95% known mammal species that occur in the Atlantic forest (Table 2). The information on species individual variation in this dataset corresponds to 97% of the species found in ATLANTIC SMALL MAMMAL (Bovendorp et al. 2017b), 95% of species found in ATLANTIC BATS (Muylaert et al. 2017), and 94% of ATLANTIC-CAMTRAPS (Lima et al. 2017).

We suggest that, in order to increase the species, individuals and populations sampled in this dataset, researchers should provide a raw list of traits of measured individuals in supplemental material or on line datasets (e.g. Dryad). In addition, a gigantic source of information could come from studies on road kills, hunting or confiscated animals. For instance, it is estimated that 60 million vertebrates are killed in the Amazon every year (Peres 2000) and many vertebrates are road killed every year in Brazil (Rodrigues do Prado et al. 2006). Moreover, some highly common game species are poorly represented in our dataset (pacas, agoutis, capybaras and armadillos).

We expect that this database will provide comprehensive material to allow ecologists to address relevant ecological and evolutionary hypotheses at large-scale. Specifically, we suggest that our dataset could be appropriate to: i) understand macroecological patters, ii) understand potential changes in phenotypic changes due to altitudinal or latitudinal ranges or anthropogenic effects, iii) quantity and understand the drivers and consequences of intra- and interspecific morphological variation; iv) understand how metapopulations and metacommunities are structured through trait-based approaches, and v) understand how spatial dynamics and local interactions shape structure and biodiversity of mammal communities.

CLASS III. DATA SET STATUS AND ACCESSIBILITY

A. Status

Latest update: October 2017

Latest Archive date: October 2017

Metadata status: Last update 19 October 2017, version resubmitted

Data verification: Data is mostly from unpublished sources. We present information at the individual level, so the user can compute the mean and variation for each species.

B. Accessibility

Contact person: Fernando Gonçalves (fhmgoncalves@hotmail.com) and Mauro Galetti (mgaletti@rc.unesp.br), Instituto de Biociências, Departamento de Ecologia, Laboratório de Biologia da Conservação, Universidade Estadual Paulista, Rio Claro, São Paulo, 13506-900, Brasil.

Copyright restrictions: None.

Proprietary restrictions: Please cite this data paper when the data are used in publications. We also request that researchers and teachers inform us of how they are using the data.

Costs: None.

CLASS IV. DATA STRUCTURAL DESCRIPTORS

A. Data Set File

Identity: ATLANTIC-TR_all_data.csv

ATLANTIC-TR_means.csv

Size:

ATLANTIC-TR_all_data.csv 6.6 MB

ATLANTIC-TR_means.csv 47 KB

Format and storage mode: comma-separated values (.csv)

Header information: See column descriptions in section B.

Alphanumeric attributes: Mixed.

Data Anomalies: If no information is available for a given record, this is indicated as 'NA'.

B. Variable information

1) Table 4. Information about morphological traits of volant and non-volant mammals

2) Table 5. Information about means of morphological traits of volant and non-volant mammals

CLASS V. SUPPLEMENTAL DESCRIPTORS

A. Data acquisition

1. Data request history: None

2. Data set updates history: None

3. Data entry/verification procedures

G. History of data set usage

The ATLANTIC is a series of community datasets from the tropical and subtropical Atlantic forests of South America. The information provided here can be linked to mammal surveys Atlantic Small Mammals (Bovendorp et al. 2017b); Atlantic Camtraps (Lima et al. 2017); Atlantic Bats (Muylaert et al. 2017) and can predict patterns and changes in morphological traits at large scale and human disturbance.

ACKNOWLEDGMENTS

To the Conselho Nacional de Desenvolvimento Científico e Tecnológico (Brazilian Research Council, CNPq) and continuous support of Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP). This work is dedicated to the naturalists, zoologists and field ecologists who spent their time and effort in studying mammals in the Atlantic forest.

TABLES

Table 1. Number of species, individuals and locality per family of mammals measured directly from natural populations.

Order	Family	Species	Individual	Locality
Chiroptera	Phyllostomidae	61	21,368	822
	Emballonuridae	6	39	12
	Furipteridae	1	7	1
	Molossidae	7	296	20
	Noctilionidae	2	48	6
	Vespertilionidae	18	1021	133
	Mormoopidae	2	230	1
	Thyropteridae	1	1	1
Rodentia	Caviidae	6	56	660
	Cricetidae	57	12,510	956
	Cuniculidae	1	6	2
	Dasyproctidae	2	12	5
	Echimyidae	20	207	9
	Erethizontidae	4	64	27
	Ctenomyidae	1	1	1
	Muridae	3	40	13
	Sciuridae	1	24	18
Didelphimorphia	Didelphidae	28	2,699	568
Artiodactyla	Cervidae	4	14	7
	Tayassuidae	2	131	8
Carnivora	Canidae	4	122	56
	Felidae	8	174	121
	Mephitidae	1	1	1
	Mustelidae	5	43	35
	Procyonidae	3	288	58
Cingulata	Dasypodidae	5	21	12
Lagomorpha	Leporidae	2	14	5
Perissodactyla	Tapiridae	1	6	2
Pilosa	Bradypodidae	2	37	4
	Cyclopedidae	1	1	1
	Myrmecophagidae	1	24	5
Primates	Atelidae	4	33	12
	Callitrichidae	9	201	27
	Cebidae	3	102	61
	Pitheciidae	3	9	9
TOTAL		**279**	**39,850**	**388***

* Values do not add up in the column locality because several species occurred in the same locality.

Table 2. Comparison between species of mammals reported in the Atlantic forest by Paglia et al. (2012) and recorded in this dataset.

Order	Total number of species in the Atlantic forest	Species included in the dataset	Individuals measured
Didelphimorphia	22	28*	2,699
Rodentia	98	95*	12,920
Chiroptera	113	98	23,010
Primates	24	19	345
Carnivora	20	21	628
Perissodactyla	1	1	6
Artiodactyla	6	6	145
Lagomorpha	1	2*	14
Cingulata	7	5	21
Pilosa	5	4	62
Total	297	279	39,850

* includes exotic species

Table 3. Number of individuals of volant and non-volant mammals registered per Forest type in the Atlantic forest.

Forest type	Volant	Non-volant
Deciduous forest	3009	800
Semideciduous forest	5064	2576
Ombrophilous forest	13244	9659
Araucaria forest (mixed ombrophilous)	1690	3803
Total	**23,010**	**16,840**

Table 4. Information about volant and non-volant mammals. Description of the fields related with mammal information.

FIELD	DESCRIPTION	LEVELS	EXAMPLE
ID_sp	Identification code for each species	1 - 268	1
ID_register	Species registration	1 - 35461	1
group	Taxon	bats	bats
		small mammals large mammal	
order	Order of the species	Didelphimorphia	Chiroptera
		Cingulata	
		Pilosa	
		Primates	
		Rodentia	
		Lagomorpha	
		Chiroptera	
		Carnivora	
		Perissodactyla	
		Artiodactyla	
family	Family of the species		Emballonuridae
genus	Genus of the species		*Peropteryx*
binomial	Species name		*Peropteryx kappleri*
body_mass	Value derived from the mass (weight) in grams	3 - 220000	3
body_length	Extended dimension of an individual included body and head and measured in centimeters	24 - 1170	NA
		NA	
tail_length	The dimension of tail measured in centimeters	13 - 810	NA
		NA	
forearm	The dimension of forearm measured in millimeters	9 - 93.05	44.8
age	Age of the specimens	adult	adult
		juvenile	
sex	Sex of the specimens	male	female
		female	
reproductive_stage	Reproductive stage of the specimens	pregnant	NA
		scroted	
		NA	
status	Status of individual when measured	dead	dead
		alive	
longitude	Longitude in decimal degrees (GCS -		-34.844269

	WGS 84)		
latitude	Latitude in decimal degrees (GCS - WGS 84)		-7.137682
year	Year when the specimen was measured	1963 - 2017	2011
collector_name	Person who made the measurements		Anderson Feijo

Table 5. Information about means. Description of the fields related with the morphological traits means.

FIELD	DESCRIPTION	LEVELS	EXAMPLE
ID_sp	Identification code for each species	1 - 279	1
group	Taxon	Volants Non-volants	Volants
order	Order of the species	Didelphimorphia Cingulata Pilosa Primates Rodentia Lagomorpha Chiroptera Carnivora Perissodactyla Artiodactyla	Chiroptera
family	Family of the species		Emballonuridae
genus	Genus of the species		*Peropteryx*
binomial	Species name		*Peropteryx kappleri*
registers	Number of individuals per species	1- 5132	3
locals	Identification code for the location of the study	1 - 118	2
studies	Identification code for each study	1 - 61	2
N_body_mass	Number of body mass per species	1 - 5070	3
Body_mass_mean	Mean body mass (g)	2.5 - 220000	5.33
Body_mass_sd	Standard deviation of the body mass	0.25 - 19066.89 NA	2.08
Body_mass_cv	Coefficient of variation of the body mass	0.03 - 1.44 NA	0.39
N_body_length	Number of body length per species	0 - 3408	0
Body_length_mean	Mean of the body length	63 - 487.5 NA	NA
Body_length_sd	Standard deviation of the body length	0 - 105.69 NA	NA
Body_length_cv	Coefficient of variation of the body length	0 - 0.43 NA	NA

N_tail_length	Number of tail length per species	0 - 1278 NA	0
tail_length_mean	Mean of the tail length	65 - 683 NA	NA
tail_length_sd	Standard deviation of the tail length	0 - 55.68 NA	NA
tail_length_cv	Coefficient of variation of the tail length	0 - 0.6 NA	NA
N_forearm	Number of forearm per species	0 - 4713	3
forearm_mean	Mean of the dimension of the forearm	34 - 87.99 NA	43.83
forearm_sd	Standard deviation of the forearm	0.15 - 6.51 NA	0.85
forearm_cv	Coefficient of variation of the forearm	0 - 0.11 NA	0.02

Literature Cited

Araujo, M. S., and R. Costa-Pereira. 2013. Latitudinal gradients in intraspecific ecological diversity. Biology Letters **9**:20130778.

Auricchio, P., and F. Olmos. 1999. Northward range extension for the European hare, *Lepus europaeus* Pallas, 1778 (Lagomorpha - Leporidae) in Brazil. Publicacoes Avulsas do Instituto Pau Brasil de Historia Natural **02**:1-5.

Bello, C., M. Galetti, D. Montan, M. A. Pizo, T. C. Mariguela, L. Culot, F. Bufalo, F. Labecca, F. Pedrosa, R. Constantini, C. Emer, W. R. Silva, F. R. da Silva, O. Ovaskainen, and P. Jordano. 2017. Atlantic frugivory: a plant-frugivore interaction data set for the Atlantic Forest. Ecology **98**:1729.

Belmaker, J., and W. Jetz. 2015. Relative roles of ecological and energetic constraints, diversification rates and region history on global species richness gradients. Ecology Letters **18**:563-571.

Bérnils, R. S., and H. C. Costa. 2015. Brazilian reptiles.*in* R. S. Bérnils and H. C. Costa, editors. List of species. Sociedade Brasileira de Herpetologia, São Paulo.

BFG, T. B. F. G. 2015. Growing knowledge: an overview of seed plant diversity in Brazil. Rodriguésia **66**:1085-1113.

Blackwell, G. L., S. M. Bassett, and C. R. Dickman. 2006. Measurement error associated with external measurements commonly used in small-mammal studies. Journal of Mammalogy **87**:216-223.

Bolnick, D. I., P. Amarasekare, M. S. Araujo, R. Burger, J. M. Levine, M. Novak, V. H. Rudolf, S. J. Schreiber, M. C. Urban, and D. A. Vasseur. 2011. Why intraspecific trait variation matters in community ecology. Trends in Ecology and Evolution **26**:183-192.

Bolnick, D. I., R. Svanbäck, J. A. Fordyce, L. H. Yang, J. M. Davis, C. D. Hulsey, and M. L. Forister. 2002. The ecology of individuals: incidence and implications of individual specialization. The American Naturalist **161**:1-28.

Bovendorp, R. S., R. A. McCleery, and M. Galetti. 2017a. Optimising sampling methods for small mammal communities in Neotropical rainforests. Mammal Review **47**:148-158.

Bovendorp, R. S., N. Villar, E. F. de Abreu-Junior, C. Bello, A. L. Regolin, A. R. Percequillo, and M. Galetti. 2017b. Atlantic small-mammal: a dataset of communities of rodents and marsupials of the Atlantic forests of South America. Ecology **98**:2226.

Darimont, C. T., T. E. Reimchen, and P. C. Paquet. 2003. Foraging behaviour by gray wolves on salmon streams in coastal British Columbia. Canadian Journal of Zoology **81**:349-353.

de Lima, R. A., D. P. Mori, G. Pitta, M. O. Melito, C. Bello, L. F. Magnago, V. P. Zwiener, D. D. Saraiva, M. C. Marques, and A. A. de Oliveira. 2015. How much do we know about the endangered Atlantic Forest? Reviewing nearly 70 years of information on tree community surveys. Biodiversity and Conservation **24**:2135-2148.

Diaz, S., A. Purvis, J. H. Cornelissen, G. M. Mace, M. J. Donoghue, R. M. Ewers, P. Jordano, and W. D. Pearse. 2013. Functional traits, the phylogeny of function, and ecosystem service vulnerability. Ecology and Evolution **3**:2958-2975.

Estes, J. A., M. L. Riedman, M. M. Staedler, M. T. Tinker, and B. E. Lyon. 2003. Individual variation in prey selection by sea otters: patterns, causes and implications. Journal Of Animal Ecology **72**:144-155.

Estes, J. A., J. Terborgh, J. S. Brashares, M. E. Power, J. Berger, W. J. Bond, S. R. Carpenter, T. E. Essington, R. D. Holt, J. B. Jackson, R. J. Marquis, L. Oksanen, T. Oksanen, R. T. Paine, E. K. Pikitch, W. J. Ripple, S. A. Sandin, M. Scheffer, T. W. Schoener, J. B. Shurin, A. R. Sinclair, M. E. Soule, R. Virtanen, and D. A. Wardle. 2011. Trophic downgrading of planet Earth. Science **333**:301-306.

Faurby, S., and M. B. Araújo. 2017. Anthropogenic impacts weaken Bergmann's rule. Ecography **40**:683-684.

Ford, E. B. 1964. Ecological genetics. Springer, Dordrecht, London, Methuen, UK.

Galetti, M., C. R. Brocardo, R. A. Begotti, L. Hortenci, F. Rocha-Mendes, C. S. S. Bernardo, R. S. Bueno, R. Nobre, R. S. Bovendorp, R. M. Marques, F. Meirelles, S. K. Gobbo, G. Beca, G. Schmaedecke, and T. Siqueira. 2017. Defaunation and biomass collapse of mammals in the largest Atlantic forest remnant. Animal Conservation **20**:270-281.

Galindo-Leal, C., and G. I. Câmara. 2003. Atlantic forest hotspot status. Pages 3-11 *in* C. Galindo-Leal and I. G. Câmara, editors. The Atlantic forest of South America: biodiversity status, threats, and outlook. [State of the Hotspots.]. CABS and Island Press, Washington.

Gardner, A. L. 2008. Mammals of South America, Volume 1: Marsupials, Xenarthrans, Shrews, and Bats University Of Chicago Press.

Geiser, F. 1998. Evolution of daily torpor and hibernation in birds and mammals: importance of body size. Clinical and Experimental Pharmacology and Physiology **25**:736-739.

Gonçalves, F., E. Fischer, and R. Dirzo. 2017. Forest conversion to cattle ranching differentially affects taxonomic and functional groups of Neotropical bats. Biological conservation **210**:343-348.

Haddad, C. F. B., L. F. Toledo, C. P. A. Prado, D. Loebmann, J. L. Gasparini, and I. Sazima. 2013. Guia dos anfíbios da Mata Atlântica - diversidade e biologia. Anolis Books, São Paulo.
IBGE. 2013. Atlas do censo demografico 2011. Ministério do Planejamento, Orçamento e Gestão. Fundação Instituto Brasileiro de Geografia e Estatística, Rio de Janeiro.
Jetz, W., K. G. Ashton, and F. A. La Sorte. 2009. Phenotypic population divergence in terrestrial vertebrates at macro scales. Ecology Letters **12**:1137-1146.
Jones, K. E., J. Bielby, M. Cardillo, S. A. Fritz, J. O'Dell, C. D. L. Orme, K. Safi, W. Sechrest, E. H. Boakes, C. Carbone, C. Connolly, M. J. Cutts, J. K. Foster, R. Grenyer, M. Habib, C. A. Plaster, S. A. Price, E. A. Rigby, J. Rist, A. Teacher, O. R. P. Bininda-Emonds, J. L. Gittleman, G. M. Mace, and A. Purvis. 2009. PanTHERIA: a species-level database of life history, ecology, and geography of extant and recently extinct mammals. Ecology **90**: 2648.
Jorge, M. L. S. P., M. Galetti, M. C. Ribeiro, and K. M. P. M. B. Ferraz. 2013. Mammal defaunation as surrogate of trophic cascades in a biodiversity hotspot. Biological conservation **163**:49-57.
Kissling, W. D., L. Dalby, C. Flojgaard, J. Lenoir, B. Sandel, C. Sandom, K. Trojelsgaard, and J. C. Svenning. 2014. Establishing macroecological trait datasets: digitalization, extrapolation, and validation of diet preferences in terrestrial mammals worldwide. Ecology and Evolution **4**:2913-2930.
Lima, F., G. Beca, R. d. L. Muylaert, C. N. J. Jenkins, M. L. L. Perilli, A. M. d. O. Paschoal, R. L. Massara, A. P. Paglia, A. G. Chiarello, M. E. Graipel, J. J. Cherem, A. L. Regolin, L. G. R. OliveiraSantos, C. R. Brocardo, A. Paviolo, M. S. Di Bitetti, L. M. Scoss, F. L. Rocha, R. Fusco-Costa, C. A. d. Rosa, M. X. d. Silva, L. Hufnagel, P. M. Santos, G. T. Duarte, L. N. Guimarães, L. L. Bailey, F. H. G. Rodrigues, H. M. Cunha, F. M. Fantacini, G. O. Batista, J. A. Bogoni, M. A. Tortato, M. R. Luiz, N. Peroni, P. V. d. Castilho, T. B. Maccarini, V. P. Filho, C. D. Angelo, P. Cruz, V. Quiroga, M. E. Iezzi, D. Varela, S. M. C. Cavalcanti, A. C. Martensen, E. V. Maggiorini, F. F. Keesen, A. V. Nunes, G. M. Lessa, P. Cordeiro-Estrela, M. G. Beltrão, A. C. F. d. Albuquerque, B. Ingberman, C. R. Cassano, L. Cullen-Junior, M. C. Ribeiro, and M. Galetti. 2017. Atlantic-Camtraps: a dataset of medium and large terrestrial mammal communities in the Atlantic forest of South America. Ecology Accepted Author Manuscript. doi:10.1002/ecy.1998.
Mann, D. G., S. J. Thomas, and K. M. Evans. 2008. Revision of the diatom genus Sellaphora: a first account of the larger species in the British Isles. Fottea **8**:15-78.
McGill, B. J., B. J. Enquist, E. Weiher, and M. Westoby. 2006. Rebuilding community ecology from functional traits. Trends in Ecology and Evolution **21**:178-185.
Mimura, M., T. Yahara, D. P. Faith, E. Vazquez-Dominguez, R. I. Colautti, H. Araki, F. Javadi, J. Nunez-Farfan, A. S. Mori, S. Zhou, P. M. Hollingsworth, L. E. Neaves, Y. Fukano, G. F. Smith, Y. I. Sato, H. Tachida, and A. P. Hendry. 2017. Understanding and monitoring the consequences of human impacts on intraspecific variation. Evolutionary applications **10**:121-139.
MMA, M. d. M. A. d. E. d. S. P. 2010. Inventário da fauna do Município de São Paulo 2010. Diário Oficial da Cidade de São Paulo, São Paulo.
Moran, E. V., F. Hartig, and D. M. Bell. 2016. Intraspecific trait variation across scales: implications for understanding global change responses. Global Change Biology **22**:137-150.
Moreira-Lima, L. 2014. Aves da Mata Atlântica: riqueza, composicão, status, endemismos e conservacão. Universidade de São Paulo, São Paulo.
Morellato, L. P. C., and C. F. B. Haddad. 2000. Introduction: the Brazilian Atlantic forest. Biotropica **32**:786-792.
Morrone, J. J. 2014. Biogeographical regionalisation of the Neotropical region. Zootaxa **3782**:1-110.
Muylaert, R., R. Stevens, C. Esbérard, M. Mello, G. Garbino, L. Varzinczak, D. Faria, M. Weber, P. Kerches Rogeri, A. Regolin, H. Oliveira, L. Costa, M. l. Barros, G. Sabino-Santos Jr, M. A. Crepaldi de Morais, V. Kavagutti, F. Passos, E.-L. Marjakangas, F. Maia, M. Ribeiro, and M. Galetti. 2017. Atlantic bats: a dataset of bat communities from the Atlantic forests of South America. Ecology **x**:xx-xx - in press.
Myers, N., R. A. Mittermeier, C. G. Mittermeier, G. A. da Fonseca, and J. Kent. 2000. Biodiversity hotspots for conservation priorities. Nature **403**:853-858.
Nascimento, F. O., and A. Feijó. 2017. Taxonomic revision of the oncillas *Leopardus tigrinus* (Schreber, 1775)(Carnivora, Felidae). Papeis Avulsos de Zoologia (Sao Paulo) **57**:231-264.
Oliveira-Filho, A. T., and M. A. L. Fontes. 2000. Patterns of floristic differentiation among Atlantic Forests in Southeastern Brazil and the influence of climate. Biotropica **32**:793 - 810.
Pacifici, M., W. B. Foden, P. Visconti, J. E. M. Watson, S. H. M. Butchart, K. M. Kovacs, B. R. Scheffers, D. G. Hole, T. G. Martin, H. R. Akçakaya, R. T. Corlett, B. Huntley, D. Bickford, J. A. Carr, A. A. Hoffmann, G. F. Midgley, P. Pearce-Kelly, R. G. Pearson, S. E. Williams, S. G. Willis, B. Young, and C. Rondinini. 2015. Assessing species vulnerability to climate change. Nature Climate Change **5**:215-224.
Pacifici, M., P. Visconti, S. H. Butchart, J. E. Watson, F. M. Cassola, and C. Rondinini. 2017. Species/'traits influenced their response to recent climate change. Nature Climate Change **7**:205-208.

Paglia, A. P., G. A. da Fonseca, A. B. Rylands, G. Herrmann, L. M. Aguiar, A. G. Chiarello, Y. L. Leite, L. P. Costa, S. Siciliano, M. C. M. Kierulff, S. L. Mendes, V. C. Tavares, R. A. Mittermeier, and J. L. Patton. 2012. Lista anotada dos mamiferos do Brasil / Annotated checklist of Brazilian mammals. 2nd edition. Occasional Papers Conservation International, Consevation International, Arlington, VA.

Palmeirim, J. M. 1998. Analysis of skull measurements and measurers: can we use data obtained by various observers? Journal of Mammalogy **79**:1021-1028.

Patton, J. L., U. F. J. Pardiñas, and G. D'Elía. 2015. Mammals of South America. Volume 2: rodents, University of Chicago Press.

Pavan, S. E., A. C. Mendes-Oliveira, and R. S. Voss. 2017. A New Species of Monodelphis (Didelphimorphia: Didelphidae) from the Brazilian Amazon. American Museum Novitates:1-20.

Pedrosa, F., R. Salerno, F. V. B. Padilha, and M. Galetti. 2015. Current distribution of invasive feral pigs in Brazil: economic impacts and ecological uncertainty. Natureza & Concervação **13**:84–87.

Peres, C. A. 2000. Effects of subsistence hunting on vertebrate community structure in Amazonian forests. Conservation Biology **14**:240-253.

Ribeiro, M. C., J. P. Metzger, A. C. Martensen, F. J. Ponzoni, and M. M. Hirota. 2009. The Brazilian Atlantic forest: how much is left, and how is the remaining forest distributed? Implications for conservation. Biological conservation **142**:1141-1153.

Rodrigues do Prado, T., A. Achtschin Ferreira, and Z. F. Sobrinha Guimarães. 2006. Efeito da implantação de rodovias no cerrado brasileiro sobre a fauna de vertebrados. Acta Scientiarum. Biological Sciences **28**.

Roughgarden, J. 1972. Evolution of niche width. The American Naturalist **106**:683-718.

Rylands, A. B., and R. A. Mittermeier. 2014. Primate taxonomy: species and conservation. Evolutionary Anthropology **23**:8-10.

Safi, K., M. V. Cianciaruso, R. D. Loyola, D. Brito, K. Armour-Marshall, and J. A. Diniz-Filho. 2011. Understanding global patterns of mammalian functional and phylogenetic diversity. Royal Society journal Philosophical Transactions B Biological Sciences **366**:2536-2544.

Thiault, L., L. Kernaléguen, C. W. Osenberg, and J. Claudet. 2017. Progressive-Change BACIPS: a flexible approach for environmental impact assessment. Methods in Ecology and Evolution **8**:288-296.

Trevelin, L. C., R. L. Novaes, P. F. Colas-Rosas, T. C. Benathar, and C. A. Peres. 2017. Enhancing sampling design in mist-net bat surveys by accounting for sample size optimization. PLoS ONE **12**:e0174067.

Violle, C., B. J. Enquist, B. J. McGill, L. Jiang, C. H. Albert, C. Hulshof, V. Jung, and J. Messier. 2012. The return of the variance: intraspecific variability in community ecology. Trends in Ecology and Evolution **27**:244-252.

Visconti, P., R. L. Pressey, D. Giorgini, L. Maiorano, M. Bakkenes, L. Boitani, R. Alkemade, A. Falcucci, F. Chiozza, and C. Rondinini. 2011. Future hotspots of terrestrial mammal loss. Royal Society journal Philosophical Transactions B Biological Sciences **366**:2693-2702.

Voss, R. S., and L. H. Emmons. 1996. Mammalian diversity in neotropical lowland rainforests: a preliminary assessment. Bulletin of the American Museum of Natural History, New York, USA.

Voss, R. S., and S. A. Jansa. 2009. Phylogenetic relationships and classification of didelphid marsupials, an extant radiation of new world metatherian mammals. Bulletin Of The American Museum Of Natural History **322**:1-177.

Wilman, H., J. Belmaker, J. Simpson, C. de la Rosa, M. M. Rivadeneira, and W. Jetz. 2014. EltonTraits 1.0: Species-level foraging attributes of the world's birds and mammals. Ecology **95**:2027-2027.

Wilson, D. E., and D. M. Reeder. 2005. Mammal species of the world. A taxonomic and geographic reference. Johns Hopkins University Press, Baltimore, USA.