



Women in Brazilian mammalogy: the pioneers and the prominent members of the Brazilian Society of Mammalogy

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Abstract: Despite the relatively short history of the Brazilian Society of Mammalogy (SBMz) with its 31 years, some remarkable women made significant contributions, not only to the SBMz, but also to the Brazilian mammalogy in general. Even before the consolidation of the SBMz, several women, regardless of their position in the society and academy, developed and participated in activities that were essential to the current knowledge on Neotropical mammalogy. To highlight the contributions of such women and her successors in Mammalogy, we describe the careers and accomplishments of 21 women in short biographical notes. Our selection includes women that worked from the early 20th century until the beginnings of the 21st century in two categories: SBMz's members and relevant non-members. We shall not forget the Archduchess Leopoldine of Austria, an educated and natural sciences enthusiast that, through her marriage with the Crown Prince D. Pedro I of Brazil, literally brought in her "wedding baggage" the opening to the natural history knowledge of Brazil in early XIX century.

Key-Words: Emilie Snethlage; Leopoldine of Austria; Neotropical mammalogy; Research; 20th century.

Resumo: Mulheres na mastozoologia brasileira: as pioneiras e a Sociedade Brasileira de Mastozoologia. Apesar da Sociedade Brasileira de Mastozoologia (SBMz) ser relativamente nova (31 anos), algumas mulheres notáveis fizeram significativas contribuições, não somente para a SBMz, mas para o estudo de mamíferos no Brasil, porém nunca receberam uma merecida homenagem. Ainda, antes da consolidação da SBMz, algumas delas, a despeito de sua posição na sociedade e na academia, desenvolveram ou participaram de atos que foram essenciais para o que hoje conhecemos sobre a Mastozoologia Neotropical. Para divulgar as contribuições dessas importantes mulheres na mastozoologia, nós elaboramos resumos biográficos de 21 delas, do início do século XX até o ano 2000, separando os registros entre membros da SBMz e aquelas que não são membros. Não podemos nos esquecer da Arquiduquesa Leopoldina da Áustria, uma mulher extremamente culta e interessada em ciências naturais, que no início do século XIX, através de seu casamento com o Príncipe-herdeiro D. Pedro I do Brasil, literalmente trouxe em sua bagagem de núpcias o que seria a abertura do Brasil para o conhecimento científico nas disciplinas da história natural.

Palavras-Chave: Emilie Snethlage; Imperatriz Maria Leopoldina; Mastozoologia Neotropical; Pesquisa; Século XX.

We delineated our essay to include pioneer women dedicated to studies on the Brazilian mammalian fauna and women that contributed to consolidate mammalogy in Brazil (several still contributing to this date). For the latter group, we have arbitrarily included those women with PhD completed until 2000 (four exceptions, being two PhDs, a collection manager and a noblewoman, are explained in the proper sections). Consequently, some important women were excluded, but were not forgotten. Some of the women mentioned herein suffered some kind of prejudice or harassment during their careers, as most women still do in most professions

nowadays. In spite of that, they have become examples of successful women and here they are remembered for their great contribution to mammalogy in Brazil. We included, when possible, personal notes from our own experience or the experience of colleagues that have known, lived and/or worked with some of these exceptional women.

The account was organized in chronological order of their graduation. Their professional information was taken from *Plataforma Lattes* (<http://buscatextual.cnpq.br/buscatextual>), or other sources when specified, and the cut-off date was May 2018, when the first draft of



the text was finalized. The first information between brackets is the year they obtained their bachelor's degree, followed when appropriate by the year of death and the symbol '†'. This work was broadly inspired on Stein (1996) and Kaufman *et al.* (1996), who highlighted the contribution of women in the early years of mammalogy in the United States of America and in the development and consolidation of the first 30 years of the American Society of Mammalogists, respectively.

EARLY 20TH CENTURY

Emilie Snethlage

(active in Brazil from 1905 to her death in 1929)

The first female who worked with mammals in Brazil was a naturalist, who collected and studied these animals almost a century before the establishment of the Brazilian Society of Mammalogy, in 1985. The German-born Brazilian naturalist Emilie Snethlage (German name Henriette Mathilde Maria Elizabeth Emilie Snethlage) was better known for her studies on birds, but also can easily be considered a mammalogist.

Coming from a Lutheran family, Emilie Snethlage (Figure 1) since an early age was independent and interested in nature (Snethlage, 1930). She had a home education but was approved to be a tutor in high schools (1889) and tutored for 10 years throughout three countries (England, Ireland and Germany). In 1899, she received a small inheritance and could realize her dream of attending higher education (Snethlage, 1930). She was one of the first women to study at the University of Berlin, where she graduated in Natural History (1899). Her PhD degree (1904) in arthropod muscle morphology was developed in two universities, Jena and Freiburg, Germany.

Emilie Snethlage came to Brazil in 1905, invited by Swiss zoologist Emilio Goeldi to work as zoology

assistant at *Museu Paraense Emílio Goeldi* – MPEG (that time *Museu Goeldi*), in Belém, Pará State. She was the first woman employed by the government of the State of Pará, where she stayed for 17 years. At MPEG she worked with two directors until 1914, when she was invited to assume the head of the institution. In 1921, the funding for the MPEG decreased with the decline of the regional based economy of latex extraction, and in 1922 Emilie was invited to take a job as a field naturalist at *Museu Nacional*, in Rio de Janeiro State. Emilie conducted fieldwork in several occasions and places during her life as a zoologist in Brazil. Pioneer, one of the most emblematic moments was the expedition throughout an unmapped region between the Xingu and Tapajós Rivers during 1909, in central and western Brazilian Amazonia, on foot and escorted by seven local indigenous people (Junghans, 2008).

Emilie undertook at least 18 large expeditions in Brazil and collected ca. 10.000 birds and mammals, which are deposited in scientific museums of Brazil, Europe and United States (Sanjab *et al.*, 2013; Bezerra, *pers. obs.*). Her last expedition was in 1929 to the Madeira River, in Porto Velho, Rondônia State, when she got sick and passed away at age 61. She had 43 scientific papers published (Junghans, 2008) and among the mammal specimens collected by Emilie, there are several holotypes of species described by Oldfield Thomas (*e.g.*, Thomas, 1910, 1920a, 1920b) and João Moojen (*e.g.*, Moojen, 1948), such as the Pale-brown ghost bat *Diclidurus isabella* (Thomas, 1920) and the Rio Negro brush-tailed rat *Isothrix negrensis* Thomas, 1920. Due to her importance in Brazilian mammalogy she was honored with species named after her, such as the Snethlage's tigrina *Leopardus emiliae* (Thomas, 1914), the tuff-tailed spiny tree rat *Lonchothrix emiliae* Thomas, 1920a (also a new genus), and the Snethlage's marmoset *Mico emiliae* (Thomas, 1920b) (all of them based on specimens collected by her). Animals of other groups have also been



Figure 1: Emilie Snethlage (left) during a fieldwork in Amazon and (right) seated in a chaise in a balcony of *Museu Nacional/Universidade Federal do Rio de Janeiro*, Rio de Janeiro in 1926. Sources: Emil-Heinrich Snethlage, Snethlage Family collection, and *Arquivo Guilherme De La Penha/Museu Paraense Emílio Goeldi*, respectively.



named after her, e.g., the armored catfish *Peckoltia snethlageae* (Steindachner, 1911), the Utinga Surinam toad *Pipa snethlageae* Müller, 1914, the Earth snake *Atractus snethlageae* Cunha and Nascimento, 1983, the lizard *Loxopholis snethlageae* (Avila-Pires, 1995), and the Madeira parakeet *Pyrrhura snethlageae* Joseph and Bates, 2002.

WOMEN IN THE EARLY YEARS OF THE BRAZILIAN SOCIETY OF MAMMALOGY (1985-2000)

**Margarete Suñé Mattevi, PhD
(1963, 2013†)**

Described by her colleagues and friends as a “very enthusiastic, wonderful, and kind professional and person”, Margarete Mattevi (Figure 2) had an important role in integrating research and researchers from several academic areas and countries. She pioneered animal cytogenetics in Brazil. Her life was intrinsically linked with the *Universidade Federal do Rio Grande do Sul* – UFRGS, Porto Alegre, Rio Grande do Sul State, where she obtained all degrees and became professor.

She obtained a bachelor’s degree in Biology in 1963. During her undergraduate studies, she started to work on human cytogenetics (Salzano, 2014) at the Genetics and Molecular Biology Graduate Program of the UFRGS. There, she carried out her MSc (1970) and PhD (1974) projects for her degrees in Genetics and Molecular Biology.

Margarete was Professor at the Genetics Department of UFRGS (1964-1995) and Professor Emerita at the same department until 2007. After her retirement she also became Professor at the *Universidade Luterana do Brasil* – ULBRA (2001-2011), in Canoas, Rio Grande do Sul State. She worked actively throughout her life; Margarete passed away in 2013 at the age of 72.

A curiosity about the Margarete’s MSc: her project on animal cytogenetics was the first MSc thesis finished at the Genetic and Molecular Biology Graduate program of UFRGS. She did it in one month, simultaneously with her PhD in human genetics (Mattevi & Menezes, 2009).

Academic output

Margarete Mattevi was one of the most active Brazilian mammalogists. She had two major research fields, human genetics and mammalian molecular cytogenetics, with a broad network of national and international collaborations. In mammalogy, she worked mainly with Neotropical rodents, marsupials, bats, and ungulates on cytogenetics, mitochondrial and nuclear DNA, and biodiversity. Between 1970 and 2011, she markedly contributed to the knowledge of the Neotropical mammalian cytogenetics and molecular cytogenetics, publishing 79 papers in scientific journals and five book chapters, and was referee at least in 13 scientific journals. She supervised 44 undergraduate students, 22 masters, 14 PhDs, and three postdoctoral fellows. Among her ex-students,

several are currently prominent researchers working in universities and research institutes in Brazil.

Service to the Brazilian Society of Mammalogy

Margarete Mattevi was an active member of the Brazilian Society of Mammalogy (SBMz) from 1985 to 2008.

**Maria Dalva Antunes de Mello, PhD
(1967, 2007†)**

Dalva (Figure 2) was one of the first parasitologists with a focus on the Neotropical non-volant small mammals and endemic zoonosis. She was far ahead of her time, and beyond her research and teaching activities she was an art enthusiast, organized art exhibitions, had four photography books published, and managed a bar. She earned her bachelor’s degree in Natural History (1967) by *Universidade Federal de Pernambuco* – UFPE, Recife, Pernambuco State, and obtained a specialization in Health Sciences (1968) at the same university. Her master’s (1974) and PhD (1980) degrees were in Parasitology from *Universidade Federal de Minas Gerais* – UFMG, Belo Horizonte, Minas Gerais State, and *Universidade de São Paulo* – USP, São Paulo, São Paulo State, respectively.

Dalva was Professor at the Nursing Department of the Health Sciences Faculty of the *Universidade de Brasília* – UnB, Brasília, Federal District (1972-1997), and Collaborator Researcher there until 2005. Actively working throughout most of her life, besides being a researcher, she had excellent administrative skills, demonstrated by her good relationship with governmental health and environmental agencies.

Academic output

Maria Dalva markedly contributed to the knowledge of the Neotropical mammalian parasitology. In her academic life (1967-2005), Maria Dalva edited one book *Roedores da região Neotropical e patógenos de importância para o Homem* (Mello, 1985), and she has published 22 papers in scientific journals, and three book chapters.

Service to the Brazilian Society of Mammalogy

Dalva was the first female President of the board of directors of SBMz (1991-1994).

**Cecília Torres de Assumpção, PhD
(1976, 1985†)**

Cecília was a great primatologist that worked on ethology and systematics and passed away at a young age. She had a bachelor’s degree in Biology from the USP, São Paulo, São Paulo State (1976), and received a



Figure 2: Margarete Mattevi in the laboratory (left) and Dalva Antunes (right), with her former husband Frederico Simões Barbosa. Sources: <http://www.ufrgs.br/ppgbmmuseu/index.php/2014-05-23-13-37-21/fotos/item/51-decada-de-1960> and Alessandra S. Barbosa, respectively.

PhD degree (1983) from the University of Edinburgh. Described by colleagues and students as very intelligent, shy, and serious, Cecília (Figure 3) was an Associate Researcher at Biosciences Institute of USP.

Academic output

Cecília's PhD thesis (Torres, 1983) was a very important study on capuchin monkeys (*Sapajus*), comprising 337 pages divided in two research fields, ethology and a systematic revision of the genus. This work has never been published, but a summary paper of her PhD was posthumously published (Rylands *et al.*, 2005; Torres, 1988). Cecília also made the Portuguese translation of the book "Social behaviour of animals" by Deag (1981).

Service to the Brazilian Society of Mammalogy

In 1982, during the Meeting of the Brazilian Society for the Advancement of Science (SBPC) in Campinas, São Paulo State, Cecília, together with Rui Cerqueira and Mario de Vivo, raised the need of surveying the real number of researchers working on mammals in Brazil (Cerqueira, 2005). Cecília made a list of possible mammalogists interested in participating in a future society and Rui contacted them about this idea; in the following two years, the idea of founding a Brazilian Society of Mammalogy emerged. She was present during the SBMz founding meeting in 1985, during the XII Brazilian

Zoological Congress held in Campinas, São Paulo State, being also a founder. Cecília was also the 2nd Secretary of the Brazilian Society of Primatology (1985).

Eleonora Trajano, PhD (1977)

Cavernicola and *Universidade de São Paulo* are the two main keywords for Eleonora Trajano. With a degree in Biology (1977) from Biosciences Institute of USP, she developed her entire academic life in that institution, where she also obtained a MSc degree in Zoology (1981) and PhD degree in Biological Sciences (1987). Eleonora (Figure 3) was also a professor in the Zoology Department of USP (1981-2015), having a Full Professor appointment from 2006 to 2012 when she retired and became a Senior Professor until 2015. Currently she is Professor Emerita of the Ecology and Evolutionary Biology Department at *Universidade Federal de São Carlos* – UFSCar and teacher in the Bioethics Postgraduate Program at the *Centro Universitário São Camilo*, Pompéia campus, São Paulo State.

Described by some colleagues as a bulldozer during fieldwork, Eleonora is always very active. Zoologist in essence, Eleonora has an eclectic professional trajectory, working from invertebrates to catfishes and bats, but always with a common denominator, the speleological world.



Academic output

Eleonora Trajano markedly contributed to the knowledge of the Neotropical speleology and subterranean biology. In mammalogy context, her focus was on bat interactions in these ecosystems. She has published up to 87 papers until 2014 in scientific journals, four books, and 24 book chapters, and was referee at least in 11 scientific journals. She supervised five undergraduate students, 12 masters, and 12 PhDs.

Service to the Brazilian Society of Mammalogy

She participated in the founding of the SBMZ in 1985.

Vera Maria Ferreira da Silva, PhD (1977)

Vera (Figure 3) is one of the main specialists in Amazonian aquatic mammals, coordinating several projects aimed at the knowledge and conservation of cetaceans and manatees. She earned her bachelor's degree in Biology from UnB (1977), her MSc degree in Fish and Freshwater (1983) from *Instituto Nacional de Pesquisas Amazônicas* – INPA, Manaus, Amazonas State, and the PhD in Mammalian Ecology and Reproduction (1994) from University of Cambridge, England.

Vera is Researcher at INPA since 1981, where she is the leader of the Laboratory of Aquatic Mammals and Assistant Curator of the Mammal Collection. Since 1993 she also coordinates the Boto Project, a large project of population biology, ecology, and behavior of two Amazon dolphins, developed at Mamirauá Sustainable Development Reserve, Amazonas State, Brazil.

Academic output

Vera contributed markedly to the knowledge of Amazonian aquatic mammals, with a focus on conservation and population ecology. Since 1980, she has

published 85 papers in scientific journals, five books, and 35 book chapters, was referee in at least five scientific journals and member of the editorial board of three journals. She supervised nine undergraduate students, 28 masters, and six PhDs.

Service to the Brazilian Society of Mammalogy

She was also a founder of SBMZ and her name appears in the founding document of SBMZ.

Suely Aparecida Marques-Aguiar, PhD (1979)

“Batgirl”, is how the gentle Suely (Figure 4) is dubbed by her colleagues from *Museu Paraense Emilio Goeldi* – MPEG. With a bachelor's degree in Biology (1979) from the Bioscience Institute of USP, she pursued her MSc in Biology (Ecology) (1984) at INPA, and her PhD in Biological Sciences (Zoology) (1993) at the George Washington University, United States of America.

Suely worked almost all her professional life at the Section of Mammalogy of MPEG (1983-2016), where she started as a Researcher Fellow and climbed up to Curator in Chief (1985-2014). Retired in 2016, she still works at the same institution as an Associate Researcher. Zoologist in essence, she contributed to the development of what is the third largest scientific mammal collection of Latin America.

Academic output

Her major research interests include systematics, taxonomy, and ecology, with an emphasis on Neotropical bats. An important contribution for the Neotropical mammalogy is Suely's PhD thesis “A systematic review of the large species of *Artibeus* Leach, 1821 (Mammalia: Chiroptera) with some phylogenetic inferences” (Marques-Aguiar, 1994). This work was primordial for the taxonomic acknowledgement of the bat genus *Artibeus* (Phyllostomidae: Stenodermatinae)



Figure 3: Cecília Assumpção teaching (left), Eleonora Trajano in amuse moment with friends (middle), and Vera da Silva in the fieldwork (right). Sources: Eleonora Trajano, Cleyton F. Lino, and <http://museunaflorista.weebly.com/vera-da-silva1.html>, respectively.



and is mandatory in taxonomic studies of the subfamily Stenodermatinae.

She has published 26 papers in scientific journals and 17 book chapters and edited five books. She has supervised 15 undergraduate students and four masters.

Service to the Brazilian Society of Mammalogy

She was also a founder of SBMZ and her name appears in the founding document of SBMZ. She is still an active associate member.

Cibele Rodrigues Bonvicino, PhD (1983)

“Multifaceted” could be a good nickname to Cibele Bonvicino (Figure 4), one of the most active Brazilian mammalogists at present. She has two major research fields, human oncology and mammalian systematics, evolution, and conservation. With an insightful and outstanding personality, Cibele has been one of the main contributors to the knowledge of the Neotropical mammalogy. With ca. 1,220 citations of her authored or coauthored papers, she is the researcher who has described more new species of Brazilian mammals in the last 25 years. Besides, she carried out hundreds of field expeditions, mainly in the Cerrado and Amazonia domains, contributing with a large amount of precious material

(from mammal specimens to its parasites, tissues and blood samples) to several scientific mammal collections, such as of the *Museu Nacional/Universidade Federal do Rio de Janeiro* – MN/UFRJ, MPEG, UnB, and the *Laboratório de Biologia e Parasitologia de Mamíferos Silvestres Reservatórios* – LABPMR, of *Fundação Oswaldo Cruz* – FIOCRUZ. Her colleagues describe Cibele as a person that lifts you up professionally and personally; she greatly cares for her students and early career colleagues.

Cibele obtained her bachelor’s degree in Biology (1983) from the *Universidade Estadual Paulista Júlio de Mesquita Filho* – UNESP, Rio Claro, São Paulo State. She has a MSc degree in Zoology (1988) from the *Universidade Federal da Paraíba* – UFPB, and PhD in Genetics (1994) from the *Universidade Federal do Rio de Janeiro* – UFRJ.

Since 1996, she works as a scientific researcher at *Instituto Nacional de Câncer* – INCa, Rio de Janeiro, and since 2001 is an Associate Researcher at FIOCRUZ, also in Rio de Janeiro. She is moreover the Curator in chief of the Mammalian Reference Collection for zoonotic diseases at LABPMR, FIOCRUZ.

Academic output

Her major areas of research interest include evolution, genetics, systematics, cytogenetics, zoonosis and biogeography of mammals, with emphasis on Neotropical rodents, marsupials and primates, with a broad network of national and international collaborators. Since



Figure 4: Suely Marques-Aguiar in the mammal collection of *Museu Paraense Emilio Goeldi* – MPEG (left) and Cibele Bonvicino teaching at *Sociedade Brasileira de Mastozoologia* meeting (right), at *Pontifícia Universidade Católica de Minas*, Belo Horizonte, Minas Gerais State. Sources: Mammalogy/MPEG and *Sociedade Brasileira de Mastozoologia*, respectively.



her graduation she has published 147 papers in scientific journals, written 19 book chapters, and edited an important book to field studies of Brazilian rodents species, the *Guia dos roedores do Brasil, com chaves para gêneros baseadas em caracteres externos* (Bonvicino *et al.*, 2008), and has been referee in at least 16 scientific journals. She has supervised 42 undergraduate students, 17 masters and 13 PhDs, and supervised eight postdoctoral fellows.

Service to the Brazilian Society of Mammalogy

Cibele is a founder of SBMz and was the vice-president during two terms (2008-2010 and 2010-2012) and the second female President of the board of directors of SBMz in two terms (2012-2014 and 2014-2017).

She actively participated on the dissemination and integration of mammalogy in Brazil and Latin America, organizing three scientific events and two field courses, as follow: I Symposium of Mammalian Evolution (2013), Rio de Janeiro, Rio de Janeiro State; VIII Brazilian Congress of Mammalogy (2015), João Pessoa, Paraíba State; IX Brazilian Congress of Mammalogy (2017), Pirenópolis, Goiás State, and the courses of "Classification and taxidermy of small mammals", in Corumbá, Mato Grosso State (2012), and Ilhéus, Bahia State (2015), respectively. During her terms, she promoted a stronger integration among the mammalogy societies of Latin America.

Helena de Godoy Bergallo, PhD (1984)

Nena (Figure 5), as she is known among friends and colleagues, who describe her as modest and opened to dialogue, is a very prolific and active Brazilian mammalogist. Her main research field is community ecology, including aspects of natural history, parasitology and demography. In the last 24 years, she has been one of the main contributors to the knowledge of the Neotropical mammalogy, with ca. 1,550 citations of her authored and coauthored papers.

Nena has a bachelor's degree in Biology from the *Universidade do Estado do Rio de Janeiro – UERJ* (1984), and MSc (1991) and PhD (1995) degrees in Ecology from the *Universidade de Campinas – UNICAMP*. Since 1996, Nena is Professor at the Ecology Department of UERJ, where she holds a series of activities participating in committees, councils, projects, and tutoring and supervising students. She has also been linked to several universities and research institutes as Collaborator. She coordinates the *Rede de Pesquisa em Biodiversidade da Mata Atlântica – PPBio MA* (since 2013), an official program of Brazilian Ministry of Sciences, Technology, Innovation, and Communication – MCTIC.

Academic output

Nena's major research interests include community ecology, invasive species, conservation, parasitology, and population ecology of small mammals. Since her

graduation, she has published 150 scientific papers and 34 book chapters, edited six books, and has been referee in at least 41 scientific journals. She has supervised almost 100 students, including 31 undergraduates, 34 masters, 22 PhDs, and four postdoctoral fellows.

Service to the Brazilian Society of Mammalogy

Founder of SBMz in 1985, she acted as Second Secretary of the board of SBMz in two terms (1998-2005 and 2005-2008). She organized the IV Brazilian Congress of Mammalogy (2008), in São Lourenço, Minas Gerais state.

Lena Geise, PhD (1984)

Lena (Figure 5) is a very active Brazilian mammalogist; she is a researcher, professor, and scientific journal editor. Her main research field is taxonomy of small mammals, with other interests including, evolution, biogeography and conservation. Like Cibele, Lena carried on several field expeditions that resulted in the collection of a large number of small mammal specimens. Her fieldwork is focused in the Atlantic Rainforest domain and the material gathered in these expeditions is mostly deposited at *Museu Nacional/UFRJ*, where they are considered always very well prepared and precisely annotated.

She obtained a bachelor's degree in Biology at the *Universidade do Estado do Rio de Janeiro – UERJ* (1984), Rio de Janeiro State, the MSc degree in Biological Sciences (Zoology) at USP (1989) and the PhD in Genetics at UFRJ (1995). Lena held a postdoctoral fellowship (2009-2010) at the Museum of Vertebrate Zoology, University of California, Berkeley, USA.

Since 1996, Lena is Professor at the Zoology Department of UERJ. There she holds a series of activities besides teaching, like participating in committees, councils, projects, and tutoring and supervising students. In more recent years she has also shown to be a very good craftswoman, activity she holds in parallel with teaching and research.

Academic output

Her major research interests include evolution, systematics, biogeography and cytogenetics of mammals, with an emphasis on rodents, marsupials and bats. Since 1987, she has published 69 papers in scientific journals and 10 book chapters; Lena has been member of editorial board of four journals and referee in at least 25 scientific journals. She has supervised 31 undergraduate students, eight MSc, 16 PhDs, and one postdoctoral fellow.

Service to the Brazilian Society of Mammalogy

Founder of SBMz (1985), she acted as First Secretary of the board of SBMz (2005-2008). She organized four SBMz scientific events: I Symposium of Mammalian Evolution (2013), Rio de Janeiro, Rio de Janeiro State; I and II



Figure 5: Helena Bergallo (left) and Lena Geise (right) in the fieldworks. Sources: Daniel Raíces and Diego A. Moraes, respectively.

Meeting of mammalogists of Rio de Janeiro State (2012 and 2013), in Teresópolis; and IV Brazilian Congress of Mammalogy (2008), in São Lourenço, Minas Gerais State.

Since 2013 Lena is editor of the Bulletin of the Brazilian Society of Mammalogy, position that she holds with commitment and enthusiasm.

Leila Maria Pessôa, PhD (1985)

Leila (Figure 6) is an enthusiastic mammalogist and passionate teacher. Her main research line is taxonomy and evolution of Brazilian small mammals. She is one of the precursors in high level and complex studies of vertebrate morphometric analysis in Brazil. Very hardworking and professional, sometimes she seems to be a very solemn woman, but in fact is an introspective woman with a big heart.

Leila has a bachelor's degree in Ecology from UFRJ (1985), Rio de Janeiro State, MSc in Biological Sciences (Zoology) from UFRJ (1989) and a PhD from UNESP (1995). She did an internship in Molecular Biology (1993) at University of California, Berkeley and a held a postdoc fellowship (1998) at Texas Tech University, Lubbock, TX, USA.

Since 1993 Leila is Professor at the Zoology Department of UFRJ, Rio de Janeiro, Rio de Janeiro State, where she holds several activities regarding the University,

from teaching to participating in committees, councils, and research projects.

Academic output

Her major research lines include ontogeny and morphometrics, cytogenetics, and molecular variability in Brazilian small mammals, with particular interest in bats and echimyid rodents. Since her graduation she has published 67 papers in scientific journals and eight book chapters, edited one book, and has been member of editorial board of eight and referee of nine scientific journals. She has supervised 30 undergraduate, 17 masters, and eight PhDs students.

Service to the Brazilian Society of Mammalogy

She is a founder of SBMz and acted as First Secretary of the board of SBMz (2008-2010). She also edited a book sponsored by SBMz, *Mamíferos de Restingas e Manguezais do Brasil* (Pessôa et al., 2010).

Maria Nazareth Ferreira da Silva, PhD (1985)

Maria Nazareth (Figure 6) is one of the main specialists in Amazonian mammals. She described 11 new species, among primates and rodents, for the Brazilian



Figure 6: Leila Pessôa in amuse moment (left) and Maria Nazareth (right) in the fieldwork. Sources: Leila Pessôa's Facebook® and Carla Bantel.

Amazon, being the second most prolific scientist describing new mammal species in Brazil in the last 25 years.

She has a bachelor's degree in Biology from UnB (1985) and a PhD degree in Zoology (1995) from the University of California, Berkeley. She held a postdoc fellowship in Taxonomy at UNICAMP (2007-2009), São Paulo State, and another one at *Université de Montpellier* (2015), France. Since 1985 she is a Researcher at INPA, where she is also the Curator in Chief of the Mammal Collection.

Academic output

Her major research interests include systematics and taxonomy, with emphasis in morphology and molecular variability of Neotropical rodents and primates. Since her graduation, she has published 38 papers in scientific journals and nine book chapters, and edited one book. She has supervised nine undergraduate students, three masters, and co-supervised 12 masters and five PhDs.

Service to the Brazilian Society of Mammalogy

She is an associate member of SBMz since the beginning.

Stella Maris Franco, BSc (1985)

Stella (Figure 7) has two bachelor degrees: Biology (1985) from UERJ, Rio de Janeiro, and Psychology (1998) from *Faculdades Integradas Maria Thereza*, Niterói, Rio de Janeiro State. She has also two specializations, one in Clinical Health Psychology in Hospital Context (1999)

from *Hospital Getúlio Vargas-Filho*, and another in Psychoanalysis and Mental Health (2002) from UERJ.

She has been Collection Manager (1988-2013) of the Mammalogy Division of *Museu Nacional/UFRJ – MN/UFRJ*, Rio de Janeiro, Rio de Janeiro State. Since 2013 she works as laboratory assistant in the Department of Pharmacy of UFRJ, Macaé campus, Rio de Janeiro State.

Stella was in 1993 my (AMRB) first contact in the Mammal Collection of MN/UFRJ, when I started my first internship. At that time, only she and a professor worked there. Some years later, I heard from her a statement that I will always hold with me: "I love so much working here (MN/UFRJ) that I decided not to apply for a job in psychology which is my profile area." Stella was always diligent and professional in all respects to the mammalian collection there. We (authors) learned so much with Stella as she helped us and all researchers and students that visited the Mammal Collection of MN/UFRJ during those 25 years.

Academic output

Her major research interests include scientific collection management and museums of natural history. Since her bachelor's degree she has published three scientific papers on the Mammal collection of MN/UFRJ in the international journals (Bezerra *et al.*, 2004; Langguth *et al.*, 1997; Oliveira & Franco, 2005), edited one book (Siciliano & Franco, 2005), and presented four communications in scientific meetings.

Service to the Brazilian Society of Mammalogy

She is a founder of SBMz.



**Valéria Fagundes, PhD
(1989)**

Valéria (Figure 7) is described by her closest colleagues and friends as a very intense professional, with great enthusiasm to organize and implement new projects, besides being a natural leader and manager. She was a pioneer in founding the Animal Genetics Laboratory (LGA) at *Universidade Federal do Espírito Santo* – UFES, and also in helping to implement a new Graduate program in Animal Biology in that university.

Valéria has a bachelor's degree in Biology (1989) from USP, the same university where later she obtained a MSc degree (1993) and a PhD degree (1997), both in Biological Sciences (Genetics). She also held a postdoc fellowship at USP from 1997 to 2000.

Since 2000, Valéria is Professor at the UFES, where she held several coordinator positions, such as Biology Department Director (2008-2010), and Coordinator of Graduate program in Animal Biology (2001-2008; 2016-present). She was also Curator of the UFES's Vertebrates Tissue and DNA Collection. From 2010 to 2016 she has acted as Technical Scientific Director at the *Fundação de Amparo à Pesquisa e Inovação do Espírito Santo* – FAPES.

Academic output

Her major research interests include vertebrate genetics, encompassing evolutive cytogenetics, conservation genetics, evolution and phylogeography. Since her bachelor's degree she has published 45 papers in national and international journals and two book chapters, and served as referee for seven scientific journals. She has supervised 43 undergraduate, 20 masters, 10 PhD students, and one postdoctoral fellow.

Service to the Brazilian Society of Mammalogy

She is an associate member of SBMZ and has organized the III Brazilian Mammalogical Congress in 2005, in Aracruz, Espírito Santo State.

**Leonora Pires Costa, PhD
(1990)**

Leo (Figure 7), as her closest friends and colleagues know her, is a very enthusiastic, dedicated, free spirited, and proactive mammalogist. She is one of the researchers responsible for establishing an important mammalogical research group in Espírito Santo State. Due to her father's job as Director of university centers in different regions of Brazil, Leo had close experience with nature during her childhood. Together with her family, she lived in Manaus, Amazonas State, for two years and another year in Barreiras, Bahia State, so at age five, she had already had a good glimpse of the Brazilian biodiversity and wildlife!

Leo has a bachelor's degree in Biology (Zoology) (1990) from the UFMG, Belo Horizonte, Minas Gerais State, and a PhD (2001) in Integrative Biology from the University of California (UC), Berkeley. During her PhD, she was curatorial assistant at the Museum of Vertebrate Zoology and manager of the Evolutionary Genetics Laboratory, both at UC.

Since 2005, she is Professor at the UFES and Curator of the Tissue and DNA Collection of the Biological Sciences Department in that institution. She had also been collaborator in several universities and research institutes, including Associate Curator of the Mammal Collection of the Zoology Department at UFMG.

Even though she obtained her PhD in 2001 (one year above the cutoff year established for this essay), Leonora was included here due to the importance of being a pioneer, together with her collaborator, friend, and husband Yuri Leite, in founding research lines and laboratories in a historically deficient region of Brazil. Like Valéria Fagundes some years before, Leonora's laboratory is one of the main contributors to turn the Espírito Santo State into a center of excellence for studies on small mammal evolution. Leo has supervised at least 45 students in the last 13 years and has ca. 1,710 citations of her articles. Her paper, entitled "The historical bridge between the Amazon and the Atlantic Forest of Brazil:



Figure 7: Stella Franco in amuse moment (left), Valéria Fagundes in a meeting (middle), and Leonora Costa (right) in the Amazon. Sources: Stella Franco's *Currículo Lattes*, Roberta Paresque, and Leonora Costa's Facebook®, respectively.



a study of molecular phylogeography with small mammals" (2003) is a seminal contribution to the study of Neotropical phylogeography, with ca. 460 citations.

Academic output

Her major research interests include biogeography, evolution, phylogeography, and taxonomy of small non-volant mammals. Since her graduation she has published 46 scientific papers in national and international journals and 10 book chapters, edited three books, and served as referee for 10 scientific journals. She has supervised 25 undergraduate students, 14 masters, four PhDs students, and two postdoctoral fellows.

Service to the Brazilian Society of Mammalogy

She is an active associate member of SBMz and has organized the III Brazilian Mammalogical Congress in 2005, in Aracruz, Espírito Santo State.

Renata Pardini, PhD (1992)

Renata (Figure 8) is an ecologist, since her childhood fascinated with the Brazilian forests, which led her to participate in several field expeditions in Amazonia and the Atlantic Forest during her undergraduate years. She published important papers on methodology, which became inspiring to several biologists and students. She has a background in zoology and still participates in fieldwork, collecting and depositing material in scientific collections.

Renata received a bachelor's degree in Biology from USP (1992) and a direct PhD in Zoology (2001) from the same institution, where she pursued a postdoctoral fellowship in Ecology (2003). Since 2003, she is Professor at the Zoology Department of USP. She is also collaborator at the *Universidade Federal da Bahia* – UFBA, Salvador, Bahia State, and UFES. Renata serves as the representative of the Zoology Department on the board of *IB Mulheres* (IB/USP, 2018). The *IB Mulheres* is a non-official committee by the Biosciences Institute of USP that coordinates discussions and mediates conflicts related to gender, stalking and harassment issues.

As Leonora Costa, Renata's higher graduation level was obtained in 2001 (one year above the '2000 year' established for this essay), but she was also included here due to her great academic importance. Her name is never missing from conversations or paper references about community ecology of Atlantic Forest mammals. Renata is very important in her research field, having almost 4,000 citations of her articles.

Academic output

Her major research interests include landscape ecology, community ecology and conservation biology. Recently she is focusing in demography, population genetics and study of diseases to explore the patterns of

anthropized landscapes of the Atlantic Forest. Since her graduation, she has published 66 papers in national and international journals and 13 book chapters, and she has been member of the editorial board of three journals and is referee for 30 scientific journals. She has supervised 15 undergraduate students, 20 masters, eight PhDs, and three postdoctoral fellows.

Service to the Brazilian Society of Mammalogy

She is an associate member of SBMz and has organized the V Brazilian Mammalogical Congress (2010) at São Pedro, São Paulo State.

RELEVANT NON-MEMBERS

Alzira Maria Paiva de Almeida, PhD (1964)

Alzira Almeida (Figure 8) is known by her colleagues as "The Lady of the Plague", due to her importance as specialist in studying the bubonic plague. This respectful and at the same time funny nickname reflects her strong, professional and kind personality. A pioneer, her first contact with the subject was in 1966, when she and her husband, newly married, moved to Exu, Pernambuco State. He was hired by the World Health Organization to help setting up the *Plano Piloto de Peste* (in English, Pilot Plan of Plague). This plan was a field laboratory to investigate the plague ecology, coordinated by the *Institute Pasteur* (France), where studies were carried out during decades. After eight years, Alzira was already in love with Plague studies (Mello, 2018), and today she is an internationally recognized specialist. Many of her papers focus on the role of mammals in the zoonotic cycle of the bubonic plague, representing an important contribution to the knowledge on their biology, ecology and parasitology. She has a very large network of collaborations with researchers and institutes worldwide.

Graduated in Nutrition at UFPE (1964), she has a PhD degree in Microbiology from the *Université Paris 7* (1993). In 1969, she became Full Researcher at *Centro de Pesquisas Aggeu Magalhães*, FIOCRUZ-PE. Retired since 2012, she continues working actively as leader of her research group, coordinator of the "National Reference Service for Plague" and curator of a *Yersinia pestis* culture collection. She is also advisor to the Department of Health Surveillance of the Ministry of Health and Professor Emerita of UFPE.

Alzira teaches field courses in several Brazilian states. These courses aim to train health professionals on epidemiological aspects of rodent-borne diseases, including the adequate methodological procedures for collecting and handling samples for analysis in laboratory.

Academic output

Her major research interests include microbiology and parasitology, with emphasis in applied microbiology,



Figure 8: Renata Pardini (left) and Alzira Almeida (right). Sources: <http://www.ib.usp.br/dicom> and Alzira Almeida's *Currículo Lattes*, respectively.

working on epidemiology, zoonosis, hosts/reservoirs vectors and diagnosis. Although being retired, she is still publishing and since 1974 she has published 110 papers in national and international journals and 12 book chapters, edited one book, and acted as referee for 19 scientific journals. She has supervised 23 undergraduate students, 20 masters, 17 PhDs, and three postdoctoral fellows.

Yatiyo Yonenaga-Yassuda, PhD (1964)

Yatiyo's (Figure 9) academic history has a close relationship with USP and the molecular cytogenetics. Her main research line is cytogenetics and molecular biology of vertebrates. Precise and visionary, she has kept for a long time a vertebrate cell and tissue bank, the result of years of research and dedication. This is an important material that represents the Neotropical biodiversity and can be used for cytogenetics and molecular studies. In recognition of her contribution to Mammalogy, an echimyid rodent species was named after her, the Yonenaga's Atlantic spiny-rat *Trinomys yonenagae* (Rocha, 1996).

Yatiyo has a bachelor's degree in Natural History (1964) from USP, and MSc (1964) and PhD (1968) degrees in Genetics from that same institution. In 1969, she became Professor at the Biosciences Institute of USP. She is also member of the Academy of Sciences

of São Paulo. In 1998, she began to paint, in parallel with the research, starting a new and also successful career.

All colleagues that know and worked sometime with Yatiyo declared she is kind and professional. An example of her professional and kindness was testified by one of the authors. I (AMRB) had the opportunity to work in collaboration with Yatiyo in 2013 and, for a particular study, I needed to associate the field number of a specimen to the number on a tube of cell suspension. During months, nobody found these numbers, but Yatiyo searched tirelessly her files (hard copies included) and finally found it! I was so happy that I told her, "I love you!". We did not know each other in person at that time, but her reply was: "I'm going to Rio for the I Symposium of Mammalian Evolution (2013), and I want to meet who made me this lovely declaration."

Academic output

Her major research interests include animal cytogenetics and molecular genetics, including chromosome evolution, rodents and marsupial cytogenetics, and molecular systematics. From 1965 to 2015 she has published 113 papers in national and international journals and three book chapters. Yatiyo, is editorial board member of "Genetics and Molecular Biology Journal" and has acted as referee for five scientific journals. She has supervised eight undergraduate, 13 master, 15 PhD students, and two postdoctoral fellows.



Figure 9: Yatiyo Yonenaga-Yassuda at her office in *Instituto de Biologia/Universidade de São Paulo* (right) and Sanae Kashara (left, in middle two students, with Cibele Bonvicino in background) during a cytogenetic course that she done in the *Universidade Federal do Rio de Janeiro*, Rio de Janeiro, in 2009. Sources: Taís Machado and Leila Pessôa, respectively.

**Sanae Kasahara, PhD
(1971, 2018†)**

Sanae Kasahara (Figure 9) was for 40 years Professor at the UNESP Rio Claro, São Paulo State, working mostly on vertebrate cytogenetics, and was known by her colleagues as a very kind and professional person. She worked on her PhD project under the supervision of Yatiyo Yonenaga-Yassuda and continued working on the same research line thereafter. Sanae had a very important contribution by introducing several mammalogists into cytogenetic studies and by publishing important books about vertebrate cytogenetic methodology.

She obtained her bachelor's degree in Biology from USP (1971), MSc degree in Genetics from USP (1973), and PhD in Genetics also from USP (1979). She pursued a postdoctoral fellowship in Vertebrate Cytogenetics in France (*Commissariat à l'Energie Atomique Fontenay Aux Roses – 1982/1983*).

Besides her position at the UNESP Rio Claro, she has been Research Advisor at several research institutes. Even after retirement (2004), she continued working as an Associate Researcher at UNESP. Sanae passed away in January, 2018.

Academic output

Her major areas of research included chromosome painting and vertebrate cytogenetics, with several studies on rodents. She has published, from 1974 to 2014, 63 papers in national and international journals, three books and one book chapter. She has supervised 16 undergraduate, seven master, four PhD students, and one postdoctoral fellow. She also advised many graduate students (19) in cytogenetic specialization courses, including currently important mammalogists, such as Cibele R. Bonvicino, Leila M. Pessôa, and Lena Geise.

**Cleusa Yoshiko Nagamachi, PhD
(active from 1978 to present)**

Cleusa Nagamachi's (Figure 10) major research fields are vertebrate cytogenetics and chromosome painting with emphasis in mammals, the same research fields of her PhD advisor Margarete Mattevi. Cleusa, together with her husband Julio C. Pieczarka, was responsible for creating an important research group in mammalian cytogenetics in northern Brazil since she was hired as Professor at the *Universidade Federal do Pará – UFPA* (1983), Belém, Pará State. She is an internationally recognized researcher and has a long-term collaboration with researchers from the University of Cambridge, United Kingdom.

She has a degree in Biomedicine (1978) and a MSc degree in Genetics (1982), both from USP, and a PhD in Genetics and Molecular Biology from UFRGS (1995). She held a postdoctoral fellowship from the University of Cambridge (2004). In 1983, she became Professor at the UFPA and in 2016 became Full Professor at the same university.

Academic output

Since 1978 she has published 117 papers in national and international journals, and three book chapters. Cleusa has served as referee in five scientific journals. She has supervised 34 undergraduate, 18 MSc, and 15 PhD students, and currently supervises two postdoctoral fellows.

Ludmilla Moura de Souza Aguiar, PhD (1987)

Ludmilla Aguiar (Figure 10) is one of the most active Brazilian chiropterologists at present, and recently (2017) was internationally recognized with the Spallanzani Fellow by North American Society for Bat Research – NASBR. She is the third woman to receive this award.



Figure 10: Cleusa Nagamachi (left) and Ludmilla Aguiar (right) working in the laboratory, respectively. Source: Julio C. Pieczarka and <http://www.unbciencia.unb.br/biologicas/35-zoologia>, respectively.

Her major research field is on population and community ecology of bats.

She has a bachelor's degree in Biology from UFMG (1987), a MSc degree in Ecology, Conservation and Wildlife Management (1994) from the same institution, and a PhD in Ecology from UnB (2000). She pursued a postdoctoral fellowship at the University of Bristol, England (2014).

Between 2001 and 2009 Ludmilla worked as a scientific researcher at *EMBRAPA Cerrados* (2001-2009), Brasília, Federal District. She then (2009) moved for the Zoology Department of UnB as Professor. Ludmilla chose to apply for a job in the academia, so she could focus her research on bats conservation and ecology.

Academic output

Her research focuses on Chiroptera, including different aspects of their biology such as community ecology, conservation, population ecology, and bioacoustics. Since her graduation, she has published 61 papers in scientific journals, and three book chapters. Ludmilla is a member of the editorial board of *Chiroptera Neotropical* journal and has served as referee in 32 scientific journals. She has supervised 14 undergraduate, 22 master and six PhDs students.

Ludmilla is also a founder of the Brazilian Bat Research Society (2006) and the *Red Latinoamericana y del Caribe para la Conservación de los Murciélagos – RELCOM* (2007). She organized two large events, the XI International Bat Research Conference (1998), at Pirenópolis, Goiás State, and the VII Brazilian Meeting for Bat Study (2013), Brasília, Federal District, Brazil. She also created the *Chiroptera Neotropical* (1995-2015) and collaborated organizing the first list of Threatened Bats of Brazil (1995).

FINAL CONSIDERATIONS

We could consider the Empress of Brazil, Maria Leopoldina, as the Patroness of Brazilian mammalogy.

Bezerra AMR & Lazar A: Women in Brazilian mammalogy

In early XIX century, the Archduchess Leopoldine of Austria (Figure 11) came to Brazil to join in marriage the Crown Prince Dom Pedro, son of D. João VI, King of the United Kingdom of Portugal, Brazil and the Algarves. Maria Leopoldina, Portuguese name for the German Caroline Josepha Leopoldine Franziska Ferdinanda von Habsburg-Lothringen, was daughter of Franz II, the last Holy Roman Emperor (empire dissolved in 1806) and at that time King of Hungary, Croatia, Bohemia, and Emperor of Austria. Because of this engagement, the then very isolated Brazil started to receive notable young



Figure 11: Archduchess Leopoldine of Austria, by Joseph Kreutzinger, ca. 1815. Source: Schloss Schönbrunn Kultur, Wien.



naturalists from Germany, Austria and, soon after, from other European countries (HersHKovitz, 1987). Among them were important names for Brazilian mammalogy, such as Johann Baptist Ritter von Spix, Alexander Philipp Maximilian zu Wied-Neuwied, Johann Natterer, Peter Wilhelm Lund, and Johannes Theodor Reinhardt (Bezerra, 2015). These naturalists traveled throughout Brazil collecting specimens and ethnographic material, and recording in paintings, drawings and descriptions the sceneries, indigenous people, flora, and fauna of Brazil. The most famous expedition in this period was the 'Austro-German Artistic Mission', which included naturalists that came together with Archduchess Leopoldine to Brazil. A set of material and information never before known to the Brazilian natural sciences, which are the primordial source for the knowledge of several research areas in Brazil. Presently, several mammalian studies could not be complete without consulting the material and publications derived from these expeditions (Bezerra, 2015). Indeed, the arrival of these naturalists in Brazil was not by chance, since Archduchess Leopoldine was a very educated woman, as expected of a child born of the Habsburg House, and was greatly interested in natural sciences, arts, and culture (Ribeiro, 2005).

Our original intent was to survey the history of women with important contributions to Mammalogy in Brazil, but we realized that this would be incomplete without including a noblewoman, the Archduchess Leopoldine of Austria, latterly known as the Empress of Brazil Maria Leopoldina. A woman nevertheless today known by those who are not fully familiar with her history, life and personality, as the "treasured, sad and fragile spouse of D. Pedro I", consequence of her last years of life (Graham, 2010). In fact, Leopoldine was very well educated, impressively intelligent and diligent, who actively took part in politics, the arts and culture of Brazil. Researchers of natural sciences in Brazil were enhanced largely due to her presence here.

Similarly, female scientists (mammalogists in the present scope) were many times viewed only by their looks and/or under a patriarchal point of view, needing to overcome difficulties to work and get recognition by herself and her results. Therefore, we hope that the readers of this essay have learned at least a little more about these wonderful researchers. Finally, we would like to call attention to the large lapse of time between the arrival of the first researchers to Brazil (early 19th century) and the time when women effectively started to work and get recognition in mammalian research (second half of 20th century).

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