Neotropical mammals in natural history collections and research in Rome, Italy

Mamíferos neotropicais em coleções de história natural e pesquisa em Roma, Itália

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Abstract: The occurrence and the history of Neotropical mammal specimens in the collections of naturalistic museums in Rome, Italy, and their scientific utilization is here reviewed. These specimens belong to several scientific expeditions made after the discovery of the new Continent. The oldest specimens date back to the famous Museum of Athanasius Kircher at the *Collegio Romano* (1651) and to the *Museo Zoologico della Università di Roma* that was established inside the University of the Pontificial State (*Archigymnasium*) (1823). Many of these early specimens are now lost due to the complex history of Roman scientific museology, but some specimens are now available mainly in two institutions, the Museo Civico di Zoologia (established in 1932) and the *Museo di Anatomia Comparata "Battista Grassi"* of "Sapienza" University of Rome (1935). Among the numerous specimens, is noteworthy the presence of a hairy long-nosed armadillo, *Dasypus pilosus*, the first record in an Italian zoological collection and the 26th known specimen of this species in world museums. More recently, some Roman researchers have maintained a scientific interest for Neotropical mammals, including primates, with collaboration with South American mammalogists. A greater historical knowledge of scientific activities concerning the work of Italians researchers on Neotropical biodiversity should be pursued.

Keywords: *Dasypus pilosus*. Mammalogy. Naturalistic museum.

Resumén: En este trabajo se revisa la ocurrencia y la historia de especímenes de mamíferos neotropicales en las colecciones de museos naturalistas en Roma y su utilización científica. Estos especímenes pertenecen a varias expediciones científicas realizadas después del descubrimiento del nuevo continente. Los ejemplares más antiguos se remontan al famoso *Museo de Atanasio Kircher en el Collegio Romano* (1651) y al *Museo Zoológico* que se estableció dentro de la Universidad del Estado Pontificio (*Archigymnasium*) (1823). Muchos de estos primeros especímenes ahora se pierden debido a la compleja historia de la museología científica romana, pero algunos especímenes ahora están disponibles principalmente en dos instituciones, el *Museo Civico de Zoologia* (establecido en 1932) y en el *Museo di Anatomia Comparata* "*Battista Grassi*" de la Universidad Sapienza de Roma (1935). Entre los numerosos especímenes, cabe destacar la presencia de un quirquincho peludo, *Dasypus pilosus*, el primer registro en una colección zoológica italiana y uno de los 26 especímenes conocidos de esta especie en museos mundiales. Más recientemente, algunos investigadores romanos mantuvieron un interés científico por los mamíferos neotropicales, incluidos los primates, con la colaboración de los especialistas en mamíferos sudamericanos. Se debe buscar un mayor conocimiento histórico de las actividades científicas que vieron a los italianos trabajando en la biodiversidad neotropical.

Palabras-clave: *Dasypus pilosus.* Mammalogía. Museo naturalista.

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INTRODUCTION

After the discovery of the 'New World', live and dead American mammals reached the most important cities of Europe, and Rome was no exception. As the capital of the temporal power of Christianity, Rome was at the time an important political and research center. Capanna (2009) illustrated the history of the publication in Rome of Francisco Hernandez's *Novae Hispaniae Theosaurus* in 1648. He recalled how armadillos were particularly famous in Baroque Rome, with one specimen in the Museum of Athanasius Kircher (1602-1680) at the *Collegio Romano* that probably was the model utilized by Gian Lorenzo Bernini for his reproduction in the *Fontana dei Fiumi* in Piazza Navona (Capanna, 2007, 2009).

This contribution aims to provide a review on the occurrence and the history of Neotropical mammal specimens in the collections of naturalistic museums in Rome and their scientific utilization. Except in a few cases, we did not attempt a systematic taxonomic revision of the material and the main goal of the present paper is to resume a forgotten chapter about the history of scientific relationship between Italy and South America.

MATERIAL AND METHODS

We reviewed historical evidences and current specimens of South American origin housed or known to have been held in the two oldest public natural history collections sited at Rome, Italy (Giuseppini & Capanna, 2010): the *Museo Civico di Zoologia*, and the *Museo di Anatomia Comparata* "*Battista Grassi*" of the "Sapienza" University of Rome. The *Museo Civico di Zoologia* derived from the former *Museo Zoologico della Università di Roma*, but some specimens of the latter are now found elsewhere, including the *Museo di Antropologia* "*Giuseppe Sergi*" in "Sapienza" University of Rome.

For the *Museo Civico di Zoologia*, old catalogues available were checked and the specimens were surveyed along with the historic tracking of gathering of these collections in literature. Owing to the current health situation due to COVID-19, it was not possible to examine, with very few exceptions, any specimen in this Museum for the specific purpose of this paper. Therefore, the original nomenclature is always retained unless explicitly stated. For the *Museo di Anatomia Comparata* "*Battista Grassi*" all the specimens have been checked. For both the museums, when it was possible to study the specimens, we adopted the nomenclature as following: Gardner (2008) for the orders Didelphimorphia, Cingulata, and Pilosa; Patton *et al*. (2015) for Rodentia, Emmons & Feer (1997) for Primates, Acosta *et al*. (2020) for family Tayassuidae, Nascimento & Feijó (2017) for the genus *Leopardus* Gray, 1842, Merino & Rossi (2010) for the genus *Mazama* Rafinesque, 1817.

THE *MUSEO ZOOLOGICO DELLA UNIVERSITÀ DI ROMA*

A formal zoological museum was established inside the University of Rome (*Archigymnasium*) in 1823, leaded by Luigi Metaxà (1778-1842) (Giuseppini & Capanna, 2010). According to the first catalogue of the museum, realized by Temistocle Metaxà in 1853, South American mammals were prevalent inside the small zoological collection of the University (Metaxà, 1853), thus indicating the strong bond existing between the New World and the Capital of Christianity. Most of them are referred as originated from 'Brazil' (Table 1). A notable exception being three marmosets identified as *Simia jacchus* Linnaeus, 1758 and originating from Montevideo, Uruguay (although the species was unknown in this country), a gift of Pope Pio IX. Also notable are two squirrel specimens indicated to belong to *Sciurus castaneus*, a species that was reported as "descritto dal direttore del Museo di Rio de Janeiro. Esemplari del Brasile" (described by the director of the Rio de Janeiro Museum) (Metaxà, 1853), but that was never officially introduced to zoological nomenclature (a *nomen nudum*).

Already in 1853, the Museum acquired new Brazilian mammals, including two marsupial specimens: a water opossum *Chironectes minimus* (Zimmermann, 1780) (voucher n° 2609) and a brown four-eyed opossum

Metachirus nudicaudatus (É. Geoffroy, 1803) (voucher n° 2607). In 1870, Rome became the capital of the Reign of Italy. A program of development of the University of Rome was established, but it had little effects on the Zoological Museum, which remained a secondary institution in the Italian scientific panorama (Marzagora & Capanna, 2001). This suddenly changed in 1883, when Antonio Carruccio (1839-1923) moved from Modena to Rome as chair of the *Instituto e Museo di Zoologia* of Rome University (Marangoni & Gippoliti, 2011). In his 30 years of directorship, Carruccio completely refunded the museum creating an *ex novo* Rome Provincial collection and illustrating most of the new materials, including mammals, in several papers (*cf.*, Carruccio, 1898, 1899). Although no Italian explorers-naturalists of the time were closely linked to the Zoological Museum of Rome, Carruccio exploited his position in the capital of Italy to a maximum.

The Royal Family (particularly the kings Umberto I and Vittorio Emanuele III, and the Queen Elena) were among the major donors of the Zoological Museum. In 1903, thanks to Vittorio Emanuele III, the Museum received the third specimen of okapi *Okapia johnstoni* (Sclater, 1901) that reached a western museum (Carruccio, 1903). Other donors were the *Società Geografica Italiana*, the Italian *Ministero della Difesa* (Leopoldo Traversi collection from Ethiopia), the Czech explorer Emil Holub, and the *Museo Nazionale Etnografico* directed by Luigi Pigorini (nowadays *Museo Nazionale Preistorico Etnografico* '*Luigi Pigorini*', in his honor).

Table 1. List of Neotropical mammals cited by Metaxà (1843), including order, family and original identification, taxonomic comments with the presumed updated identification (see Material and Methods), number of cited specimens (N) and locality of origin (Origin). (Continue)

Original identification	Taxonomic comments	N	Origin
DIDELPHIMORPHIA			
Didelphidae			
Didelphis azarae Temminck, 1824	*Didelphys aurita* Wied-Neuwied, 1826	1	Brazil
Didelphis opossum Linnaeus, 1758	*Philander* cf. *opossum*	1	Brazil
PRIMATES			
Cebidae			
Simia sciurea Linnaeus, 1758	*Saimiri* sp.	1	Brazil
Cebus griseus Cuvier, 1819	*Cebus* sp.	1	
Pitheciidae			
Pithecia hirsuta (Spix, 1823)	*Pithecia monachus* (É. Geoffroy, 1812)	1	Brazil
Pithecia rufiventer (É. Geoffroy, 1812)	*Pithecia pithecia* (Linnaeus, 1758)	1	-
Aotidae			
Pithecia miriquouina É. Geoffroy, 1898	*Aotus azarae* (Humboldt, 1811)	1	Brazil
Callitrichidae			
Simia jacchus Linnaeus, 1758	*Callithrix jacchus* (Linnaeus, 1758)	3	Montevideo (Uruguay)
Simia penicillata É. Geoffroy, 1812	*Callithrix penicillatus* (É. Geoffroy, 1812)	1	Brazil
Simia bicolor Spix, 1823	*Saguinus bicolor* (Spix, 1823)	1	Brazil
Simia ursulus (incorrect spell of *Simia ursula* Humboldt, 1812)	*Saguinus ursula* Hoffmannsegg, 1807	1	Brazil
Simia mystax Spix, 1823	*Saguinus mystax* (Spix, 1823)	1	Brazil
Simia rosalia Linnaeus, 1766	*Leontopithecus rosalia* (Linnaeus, 1766)	3	Brazil

Table 1. (Conclusion)

Original identification	Taxonomic comments	N	Origin
CARNIVORA			
Procyonidae			
Nasua nasua (Linnaeus, 1766)	*Nasua nasua* (Linnaeus, 1766)	1	Brazil
Nasua narica (Linnaeus, 1766)	*Nasua nasua* (Linnaeus, 1766)?	4	Brazil
Mustelidae			
Mustela barbara Linnaeus, 1758	*Eira barbara* (Linnaeus, 1758)	2	Brazil
Felidae			
Felis tigrina Schreber, 1775	*Leopardus* sp.	1	Brazil
Felis onca Linnaeus, 1758	*Panthera onca* (Linnaeus, 1758)	1	-
PILOSA			
Myrmecophagidae			
Tamandua Gray, 1825	*Tamandua tetradactyla* (Linnaeus, 1758)	2	Brazil
Bradypodidae			
Bradypus tridactylus Linnaeus, 1758	*Bradypus* sp.	2	Brazil
Bradypus var. *stellata*	*Bradypus* sp.	1	Brazil
CINGULATA			
Dasypodidae			
Dasypus novemcinctus Linnaeus, 1758	*Dasypus* cf. *novemcinctus*	2	Brazil
Dasypus octocinctus Schreber, 1774	*Dasypus* cf. *novemcinctus*	1	Brazil
RODENTIA			
Sciuridae			
Sciurus castaneus nomen nudum	*Guerlinguetus* sp.	2	Brazil
Cricetidae			
Mus pyrrhorhinos Wied-Neuwied, 1821	*Wiedomys pyrrhorhinos* (Wied-Neuwied, 1821)	1	Brazil
Echimyidae			
Echimys	Echimyidae	1	Brazil
Erethizontidae			
Sphiggurus spinosa F. Cuvier, 1823	*Coendou* sp.	1	Brazil
Sphiggurus villosa F. Cuvier, 1823	*Coendou spinosus* (F. Cuvier, 1823)	1	Brazil
Dasyproctidae			
Dasyprocta aguti (Linnaeus, 1766)	*Dasyprocta* sp.	1	Brazil
Cuniculidae			
Cuniculus paca (Linnaeus, 1766)	*Cuniculus paca* (Linnaeus, 1766)	1	-
CETARTIODACTYLA			
Cervidae			
Odocoileus virginianus (Zimmmermann, 1780)	*Odocoileus virginianus*	1	Brazil

Particularly interesting and little-known are the results of several circumnavigations done by the Italian Royal Navy in South America. It should be considered that from 1866 to 1890 the Italian Royal Navy effected 11 circumnavigations of the globe and 21 oceanic campaigns (Dimpflmeier, 2014), and most of these were involved with scientific data collecting. Zoological collections were received by the corvette Caracciolo circumnavigation during the years 1881 to 1884 (Carruccio, 1885). Most mammal specimens come from South America, including two capuchins *Cebus variegatus* É. Geoffroy, 1812 from Guayaquil (Ecuador), one titi monkey *Callicebus melanochir* (Wied-Neuwied, 1820), one deer of the genus *Odocoileus* Rafinesque, 1832 from Ecuador, and one three-throated sloth *Bradypus tridactylus* Linnaeus, 1758 from Guayaquil (Carruccio, 1885). Although the period of Carruccio's directorship was the best documented for zoological collections of Rome history, the expansion of the collections was so great that the collection could not be completely studied and/or published in the journal created by himself in 1893, the *Bollettino della Società Romana di Studi Zoologici* (renamed in 1900 to *Bollettino della Società Zoologica Italiana*). After Carruccio retirement in 1914, it was given a new direction to experimental research in the Institute of Zoology. Moreover, due to lack of a definitive location for the Institute of Zoology, in 1932 most of the zoological collections were rented to the Municipality of Rome to create the *Museo Civico di Zoologia* inside the *Giardino Zoologico di Roma*.

The application of new labels and the removal of the old ones contribute to obscure the history of the University collections (*cf.*, Gippoliti & Bruner, 2007). In recent years, the discovery of an old University Museum catalogue, now preserved in the *Museo Civico di Zoologia* of Rome, has allowed to shed light about the origin of some of the specimens still in existence, including one *Dasypus villosus* (Fitzinger, 1856) from "Perù" (mounted skin) that has been re-identified by one of us (SG) as a hairy long-nosed armadillo *Dasypus pilosus* (Fitzinger, 1856) (voucher n° 2629). Presently, 25 specimens of this species are known in world museums (Feng *et al*., 2017), none of which from Italy. This is the first record in an Italian zoological collection. The species required a special attention since itis listed as "data deficient" in the IUCN red list of threatened Species (Superina & Abba, 2014).

That very important *Dasypus pilosus* specimen is the result of the collections gathered from the surgeons of the Italian Royal navy Teofilo Moscatelli and Giovanni Petella during the voyage around South America of Flavio Gioia (carried out during 1883-1886) (Petella, 1889). This was evidently possible thanks to the advice in Peru of one of the fathers of Peruvian Natural History, Antonio Raimondi (Milan 1824 – Lima 1890) (Mazzotti, 2011). Petella (1889, p. 74) regarding their exploration of the interior of Peru says "viaggio di esplorazione tracciatoci dal Raimondi per Cajamarca e Moyobamba fino a Yurimaguas sulle rive dell'Huallaga e per numerosi andirivieni fluviali a cercare la comunicazione del Purus e del Jorua coll'Ucayali al gran padre delle Amazzoni" (translation: "An exploration journey traced from Raimondi to Cajamarca and Moyobamba up to Yurimaguas on the banks of the Huallaga and for numerous river trips to seek communication between Purus and Jorua with the Ucayali to the great father of the Amazons"). Among the mammal specimens from Peru donated by Moscatelli and Petella to the Zoological Museum, we found evidence of a *Thiosmus quitensis* Less, 1838 from the interior of Peru catalogued as voucher n° 2845, probably a striped hog-nosed skunk *Conepatus amazonicus* Lichtenstein, 1838. Same origin has a squirrel *Sciurus stramineus* P. Gervais, 1841 (voucher n° 2787) and an agouti *Dasyprocta prymnolopha* Wagler, 1831 (voucher n° 2720). Further research is necessary to understand the exact origin of the mounted skin of hairy long-nosed armadillo *D. pilosus*.

Among Carruccio's paper there is often reference to specific Neotropical specimens, such as a night monkey *Aotus azarae* (Humboldt, 1811), from the Paraguayan Chaco that died in Rome and belonged to Mr. Francesco Tonini

Del Furia, formerly of the *Museo di La Plata* (Carruccio, 1896a), or to a pink hairy armadillo *Chlamyphorus truncatus* Harlan, 1825 from Mendoza, Argentina, collected by the Italian explorer Giacomo Bove around 1883-1884. Anatomical studies were performed on exotic mammals dying in Rome, such as a pale-throated sloth *Bradypus tridactylus* Linnaeus, 1758, from Brazil, or the above mentioned night monkey (Carruccio, 1896b; Condorelli Francaviglia, 1893, 1894, 1896).

An interesting small collection was acquired in 1909 from Mr. Silvio Bondimai, who spent one year in the Cerro S. Ana, Misiones province, Argentina (Carruccio, 1910). Lepri (1912) identified two felid species – the ocelot *Leopardus pardalis* (Linnaeus, 1758) and the margay *Leopardus wiedii* (Schinz, 1821), but the most interesting result was the herpetological one, with the description of two species of amphisbenids by Luigi Masi (Masi, 1911).

THE *MUSEO CIVICO DI ZOOLOGIA*

Carruccio's retirement in 1914 marks the end of this golden age for the zoological museums in Rome. After almost two decades of neglect, only in 1932 an agreement between the Rome Municipality agency and the University of Rome allowed the opening of the *Museo Civico di Zoologia*. This new zoological museum e was established inside a building in the zoological garden (in the Villa Borghese garden), under the scientific directorship of Giuseppe Lepri. Donations of trophy collections and the recovering of specimens that died at the zoological garden marked the first years (Gippoliti, 2010). Apparently, the University osteological collections were only partially sent to the new *Museo Civico di Zoologia*. Gippoliti & Bruner (2007) found that primate skulls and skeletons are now in the *Museo di Antropologia* "*Giuseppe Sergi*" of the "Sapienza" University in Rome. Several skulls of howler monkeys of the genus *Alouatta* Lacépède, 1799, possibly *Alouatta guariba* (Humboldt, 1812) (see next), which have been used in a study of functional morphology (Bruner *et al*., 2004), are originated from the '*Società Geografica Italiana*' donation in 1889 to the *Museo Zoologico della Università di Roma*. The physician Giuseppe Franco Grillo (1842-1903) sent these skulls to Rome from the Paraná state, Brazil (see Figure 1), and also several other specimens are listed in the old University catalogue, such as: a marsupial – indicated as *Philander cancrivorus* (J. A. Wagner, 1843) (voucher n° 2608), a raccoon *Procyon cancrivorus* (G. Cuvier, 1798) (voucher n° 2830), a giant otter *Pteronura brasiliensis* (Zimmermann, 1780) (voucher n° 2844), and a skull of a deer *Ozotocerus bezoarticus* (Linnaeus, 1758) (as *Cervus campestris* Cuvier, 1817) (voucher n° 2672). Giuseppe Franco Grillo was also a regular collector for the *Museo di Storia Naturale di Genova* (Thomas, 1900), as well as another Italian emigrant in Brazil, Camillo Vanzolini (Poggi, 2017). The latter is perhaps a more famous name among South American zoologists. Camillo Vanzolini married the daughter of Giuseppe Franco Grillo, Teresa Franco Grillo, and his first son, Carlos Alberto Vanzolini, was the father of Paulo Emílio Vanzolini (1924-2013) one of the most famous Brazilian herpetologists, biogeographer and musician (Burgos Dias, 2013).

After the Wold War II, particular attention was devoted by Giuseppe Tamino, curator of the *Museo Civico*, to recover cetacean specimens stranded along the

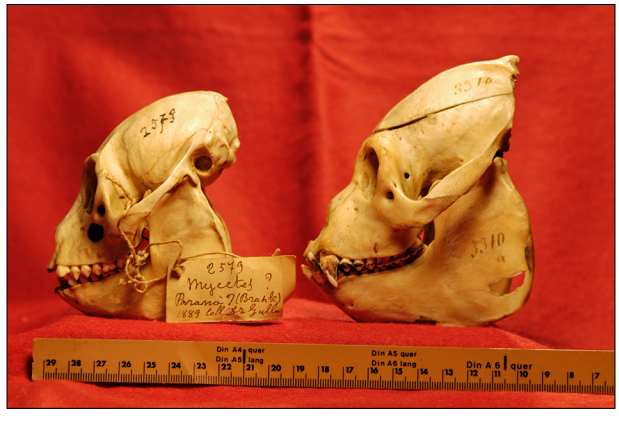

Figure 1. Skulls of primate specimens of the genus *Alouatta* presently at the *Museo di Antropologia* of "Sapienza" University, Rome, Italy. The specimen on the left (n° 2579) is one of the *Alouatta* skulls sent by Giuseppe Franco Grillo from Palmeiras, Paraná state, Brazil. Photo: Gippoliti (2006).

Italian coasts, but otherwise little documentation exists on the development of the mammal collection. During 1962-1963, Francesco Baschieri Salvadori and Guglielmo Mangili (Figure 2), of the *Giardino Zoologico* and the *Museo Civico di Zoologia* in Rome, participated in a scientific mission to Brazilian Amazon, on the Rio Negro Basin. This expedition was financed by CNR (*Consiglio Nazionale delle Ricerche*) and leaded by parasitologist Ettore Biocca of the "Sapienza" University of Rome. Although a list of vertebrate specimens, collected during the expediton, was published (Baschieri-Salvadori & Mangili, 1966; Gippoliti, 2014), including some live mammals sent to the zoological garden, they were not adequately studied and most of them were subsequently lost. The primatological results were discussed shortly by Gippoliti (2004). Parasites collected during the expedition, although never published, are presently at the *Museo Civico di Zoologia* (Annamaria Epiceno, personal communication). After his retirement, Biocca donated his zoological and ethnographical collections to the Camerino University, Macerata, Italy (Blasetti & Magnoni, 2010). There are a few mammal skins in this material, including an interesting primate of the genus *Chiropotes* Lesson, 1840 from Rio Uapés (Amazonas), obtained perhaps during the World War II, when Biocca had his first permanence in Brazil (De Marino & Schiena, 2015).

An important research program on a Neotropical primate, the robust capuchin of the genus *Sapajus* Kerr, 1792, began in the 1980's at the newly established Laboratory of Comparative Psychology of CNR (now Institute of Cognitive Sciences and Technologies), inside the Zoological Garden of Rome (Gippoliti, 2010). These researches focussed on tool use and cognitive comparison between tufted capuchin monkeys and apes. In recent years, research activities have been moved also in the field, and precisely on the robust capuchin monkey *Sapajus libidinosus* (Spix, 1823) at the *Fazenda Boa Vista* and adjacent lands, Piauí state, Brazil (Visalberghi & Fragaszy, 2013).

Figure 2. Guglielmo Mangili while preparing some primate specimens of the genus *Cacajao* taken on the Rio Cauaburi (Amazonas). Photo: Baschieri Salvadori (1963).

THE *MUSEO DI ANATOMIA COMPARATA "BATTISTA GRASSI"*, IN "SAPIENZA" UNIVERSITY OF ROME

The vertebrate collections presently hold at the Museum Comparative Anatomy (hereafter *Museo di Anatomia Comparata "Battista Grassi"*) of "Sapienza" University, is largely originated from the collection of the early Institute of Comparative Anatomy. The Institute, founded in 1873 with the annexed Museum of Anatomy and Comparative Physiology of the University, was entrusted to the German neurophysiologist and histologist Franz Böll (Giuseppini & Capanna, 2010). In 1878 this collection was placed in the former convent of S. Antonio alle Quattro Fontane, Rome, Italy, where it remained until 1929. Into following years, the collections grew especially in relation to the teaching of Comparative Anatomy by Giovanni Battista Grassi (1854-1959), who gave an evolutionary imprint to the discipline.

The *Museo*, now located in the "Sapienza" University of Rome, was inaugurated in 1935 inside the Human Anatomy building. Due to its complex history, almost all the vertebrate specimens from this institution are with no

information on their origin, and often, only the type of label bearing the name of the species can reveal the period to which it belongs. Among the specimens in the *Museo di Anatomia Comparata*, some 20 of them are certainly attributable to Neotropical mammals (Table 2), often purchased by specialized companies, such as those from the natural history dealer Gustav Adolph Frank (1809-1880, Amsterdam, Netherlands) (Steinheimer, 2003). From a quick glance at the distribution of the species in the various taxonomic orders of mammals, it is clear that the acquisition criterion was mainly didactic. In fact, the most typical components of the fauna of Neotropical mammals are well represented, in particular the xenarthrans, absent in the Old World. Out of 24 total specimens, about half belongs to this group with good representation of the two orders Pilosa and Cingulata (Table 1, Figures 3 and 4). The other specimens included Neotropical rodents showing peculiar specializations as the hairy dwarf porcupine *Coendou insidiosus* (Olfers, 1818) and the capybara *Hydrochoerus hydrochaeris* (Linnaeus, 1766), tayassuids and some small primates (*e.g.*, the marmosets of the genera *Callithrix* Erxleben, 1777 and *Saimiri* Voigt, 1831) (Table 2).

Table 2. Neotropical mammal specimens housed at the *Museo di Anatomia Comparata* "*Battista Grassi*", "Sapienza" University, Rome, Italy.

(Continue)

Taxon	Preparation type
PILOSA	
Myrmecophagidae	
Myrmecophaga tridactyla Linnaeus, 1758	Mounted skeleton
Tamandua mexicana (Saussure, 1860)	Naturalized skin
Tamandua mexicana (Saussure, 1860)	Skull
Bradypodidae	
Bradypus variegatus Schinz, 1825	Naturalized skin
Choloepus didactylus (Linnaeus, 1758)	Mounted skeleton
CINGULATA	
Chlamyphoridae	
Chaetophractus vellerosus (Gray, 1865)	Naturalized skin
Euphractus sexcinctus (Linnaeus, 1758)	Naturalized skin
Dasypodidae	
Dasypus sp.	Mounted skeleton
Dasypus sp.	Mounted skeleton
Dasypus sp.	Skull
Dasypus sp.	Skull
RODENTIA	
Chinchillidae	
Lagostomus maximus (Desmarest, 1817)	Naturalized skin
Dasyproctidae	
Dasyprocta sp.	Naturalized skin
Erethizontidae	
Coendou insidiosus (Olfers, 1818)	Naturalized skin

Table 2. (Conclusion)

Taxon	Preparation type
Caviidae	
Hydrochoerus hydrochaeris (Linnaeus, 1766)	Skull
CETARTIODACTYLA	
Tayassuidae	
Dicotyles tajacu (Link, 1795)	Naturalized skin
Dicotyles tajacu (Link, 1795)	Skull
Camelidae	
Lama guanicoe (Müller, 1776)	Mounted skeleton
PRIMATES	
Atelidae	
Alouatta palliata (Gray, 1849)	Skeleton and naturalized skin
Alouatta palliata	Skull
Alouatta cf. *belzebul*	Skull
Callitrichidae	
Callithrix jacchus (Linnaeus, 1758)	Skull and mounted skin
Cebidae	
Saimiri sp.	Mounted skeleton
SIRENIA	
Trichechidae	
Trichechus manatus Linnaeus, 1758	Skull

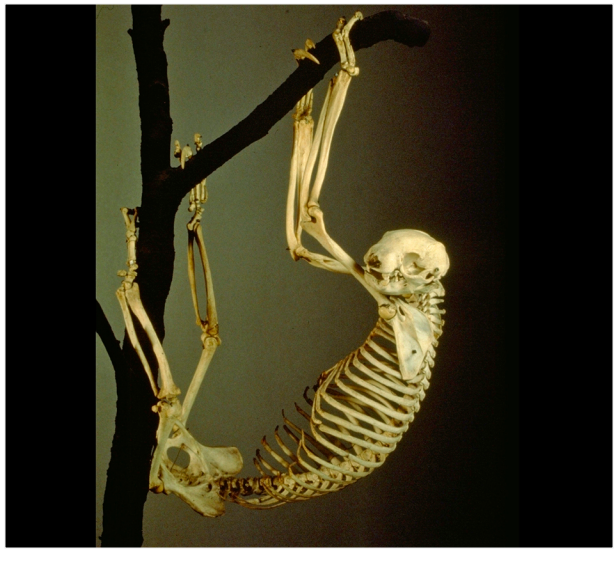

Figure 3. Entire mounted skeleton of a Southern two-toed sloth *Choloepus didactylus*, from the *Museo di Anatomia Comparata* of "Sapienza" University, Rome, Italy. Photo: Paolo Ragazzini (2000).

Figure 4. A peculiar entire skeleton of long nosed armadillo (*Dasypus* sp.) showing the dermal armour at *Museo di Anatomia Comparata* of "Sapienza" University, Rome, Italy. Photo: Paolo Ragazzini (2000).

In recent years, the Institute of Comparative Anatomy now merged into the Department of Biology and Biotechnology, has been involved in taxonomic studies on Neotropical rodents collaborating with South American researchers. We refer to the works of Ernesto Capanna and Marco Corti, both former directors of the Museum of Comparative Anatomy, carried out in collaboration with the Venezuelan researchers Angela M. G. Martino (*Universidad Nacional Experimental Francisco de Miranda*) and Marisol Aguilera (*Universidad Simón Bolívar*) (*e.g.*, Corti *et al*., 2001; Martino & Capanna, 2002). More recently, studies on mammalian fauna of Brazil have been carried out in collaboration among the current director Riccardo Castiglia (from 2016) and the Brazilian researchers Alexandra M. R. Bezerra (*Museu Paraense Emílio Goeldi*, Belém, PA, Brazil), Cibele R. Bonvicino, and Fabiana Caramaschi (Oswaldo Cruz Foundation, Instituto Nacional de Câncer, Rio de Janeiro, RJ, Brazil) (*e.g.*, Bezerra *et al*., 2018, 2019, 2020).

CONCLUSIONS

Although scarcely investigated, in recent years there has been traditionally a considerable scientific interest for South America biodiversity from several Italian institutions and researchers. Even if Rome cannot claim natural history institutions such as those in Turin, Milan and Genoa that had long-term programs and contacts with South America (*cf*. Gippoliti, 2005), yet the present overview shows as even minor Italian centre of research had the opportunity to maintain and study interesting Neotropical zoological specimens (Gippoliti *et al*., 2014). Hopefully, the present paper may serve as an invite to other students to make available to a wider audience the results of ancient and often forgotten biological surveys in the Neotropics leaded by Italian explorers and naturalists.

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REFERENCES

ACOSTA, L. E., G. S. T. GARBINO, G. M. GASPARINI & R. P. DUTRA, 2020. Unraveling the nomenclatural puzzle of the collared and white-lipped peccaries (Mammalia, Cetartiodactyla, Tayassuidae). **Zootaxa** 4851(1): 60-80. DOI: https://doi.org/10.11646/zootaxa.4851.1.2

BASCHIERI-SALVADORI, F. & G. MANGILI, 1966. Elenco dei vertebrati riportati dalla spedizione. In: E. BIOCCA (Ed.): **Viaggio tra gli Indi**: vol. 3: 211-236. CNR, Roma.

BEZERRA, A. M., R. F. CARAMASCHI, C. R. BONVICINO & R. CASTIGLIA, 2018. Integrative taxonomy of the Amazonian red-sided opossum *Monodelphis glirina* (JA Wagner, 1842) (Didelphimorphia: Didelphidae). **Zootaxa** 4508(1): 28-46. DOI: http://doi.org/10.11646/zootaxa.4508.1.2

BEZERRA, A. M. R., C. R. BONVICINO, F. P. CARAMASCHI & R. CASTIGLIA, 2019. Discovery of the rare Handley's short-tailed opossum, *Monodelphis handleyi*, in the threatened southern Amazonian savanna of Brazil. **Mammalian Biology** 97: 28-35. DOI: http://doi.org/10.1016/j.mambio.2019.04.003

BEZERRA, A. M. R., R. CASTIGLIA, L. G. PEREIRA, J. C. MOREIRA & C. R. BONVICINO, 2020. Molecular systematics of the genus *Necromys* (Rodentia: Cricetidae: Sigmodontinae) reveals two cryptic and syntopic species in western Cerrado of Brazil. **Zoologischer Anzeiger** 285: 147-158. DOI: http://doi.org/10.1016/J.JCZ.2020.02.007

BLASETTI, A. & M. L. MAGNONI, 2010. Yanoàma. L'avventura di Ettore Biocca nella selva amazzonica. **Museologia Scientifica Memorie** 6: 126-131.

BRUNER, E., S. MANTINI & G. MANZI, 2004. A geometric morphometric approach to airorhynchy and functional cranial morphology in *Alouatta* (Atelidae, Primates). **Journal of Anthropological Sciences** 82: 47-66.

BURGOS DIAS, C. E. S., 2013. Notas biográficas. **Cadernos de História da Ciência** 9: 172-180.

CAPANNA, E., 2007. *Cataphractus*: l'armadillo nelle cronache dal Nuovo Mondo e nei musei seicenteschi. **Medicina Nei Secoli** 19: 851-867.

CAPANNA, E., 2009. South American mammal diversity and Hernandez's Novae Hispaniae Thesaurus. **Rendiconti Lincei** 20: 39-60. DOI: http://doi.org/10.1007/s12210-009-0003-6

CARRUCCIO, A., 1885. VII. Zoologia. In: C. DE AMEZAGA (Ed.): **Viaggio di Circumnavigazione della Regia Corvetta "Caracciolo" negli anni 1881-82-83-84**: vol. 1: 296-318. Forzani e Comp., Tipografi del Senato, Roma.

CARRUCCIO, A., 1896a. Sopra due micro mammiferi donati al Museo Zoologico della R. Università di Roma: *Tarsipes rostratus* e *Nyctipithecus azarae* – indicazioni delle specie di Marsupiali posseduti dal predetto Museo. **Bollettino della Società Romana per gli Studi Zoologici** 5: 147-158.

CARRUCCIO, A., 1896b. Della testa ossea e del sistema dentario in particolare del *Nyctipithecus azarae* e *N. lemurinus*. **Bollettino della Società Romana per gli Studi Zoologici** 5: 218-226.

CARRUCCIO, A., 1898. Indications principales sur les vertébrés de la nouvelle collection régionale du Musée Zoologique de la R. Université de Rome. **Bollettino della Società Romana per gli Studi Zoologici** 7: 178-203.

CARRUCCIO, A., 1899. Sovra alcuni caratteri morfologici di un *Hylobates mulleri* Martin. **Bollettino della Società Romana per gli Studi Zoologici** 8: 1-16.

CARRUCCIO, A., 1903. Sull'Okapia donata da S.M. il Re Vittorio Emanuele III (Prima Parte). **Bollettino della Società Zoologica Italiana** 4: 233-253.

CARRUCCIO, A., 1910. Prime notizie su diversi vertebrati della Missiones (Repubblica Argentina) testé avuti dal Museo Zoologico della reale Università di Roma, e cenno intorno ad un *Coendu prehensilis*. **Bollettino della Società Zoologica Italiana** 11: 49-55.

CONDORELLI FRANCAVIGLIA, M., 1893. Notizie anatomiche sul *Bradypus tridactylus* L. var. *ustus* Lesson. **Bollettino della Società Romana per gli Studi Zoologici** 2: 126-137.

CONDORELLI FRANCAVIGLIA, M., 1894. Notizie anatomiche sul *Bradypus tridactylus* L. var. *ustus* Lesson. Apparecchio respiratorio e circolatorio, apparecchio uro-genitale e conclusioni. **Bollettino della Società Romana per gli Studi Zoologici** 3: 6-18; 158-171.

CONDORELLI FRANCAVIGLIA, M., 1896. Sulla persistenza delle vie della circolazione fetale nel cuore di un *Nyctipithecus*. **Bollettino della Società Romana per gli Studi Zoologici** 5: 74-78.

CORTI, M., M. AGUILERA & E. CAPANNA, 2001. Size and shape changes in the skull accompanying speciation of South American spiny rats (Rodentia: *Proechimys* spp.). **Journal of Zoology** 253(4): 537-547. DOI: http://doi.org/10.1017/S0952836901000498

DE MARINO, M. C. & G. SCHIENA, 2015. Ettore Biocca, the man and his archive (1932-2001). **Medicina nei Secoli** 27: 199-214.

DIMPFLMEIER, F., 2014. Sense of place and national identity in late–nineteenth century Italian navy travel writing. **Annuals of Marine Sociology** 23: 44-53.

EMMONS, L. H. & F. FEER, 1997. **Neotropical rainforest mammals**: a field guide: 2. ed.: 1-396. The University of Chicago Press, Chicago.

FENG, X., M. C. CASTRO, K. MCBEE & M. PAPE, 2017. Hiding in a cool climatic niche in the tropics? An assessment of the ecological biogeography of Hairy Long-Nosed Armadillos (*Dasypus pilosus*). **Tropical Conservation Science** 10: 1-13. DOI: http://doi.org/10.1177/1940082917697249

GARDNER, A. L. (Ed.), 2008. **Mammals of South America**: vol. 1: Marsupials, Xenarthrans and Shrews. The University of Chicago Press, Chicago and London.

GIPPOLITI, S., 2004. *Chiropotes* and *Cacajao* in the Pico da Neblina National Park: some historical hidden data. **Neotropical Primates** 11(3): 193-194.

GIPPOLITI, S., 2005. Historical museology meets tropical biodiversity conservation. **Biodiversity and Conservation** 14: 3127-3134. DOI: http://doi.org/10.1007/s10531-004-0381-0

GIPPOLITI, S. & E. BRUNER, 2007. The role of historical research in the study of the primatological collections: case studies from the Museum of Anthropology "G. Sergi", Rome. **Journal of Anthropological Sciences** 85: 157-162.

GIPPOLITI, S., 2010. **La giungla di Villa Borghese**: I cento anni del Giardino Zoologico di Roma: 1-206. Edizioni Belvedere, Latina.

GIPPOLITI, S., 2014. Guglielmo Mangili. Erpetologo, antropologo e artista. **Bollettino del Museo Regionale di Scienze Naturali di Torino** 30: 146-155.

GIPPOLITI, S., G. AMORI, R. CASTIGLIA, P. COLANGELO & E. CAPANNA, 2014. The relevance of Italian museums for research and conservation: the case of mammals. **Rendiconti Lincei Scienze Fisiche e Naturali** 25: 351-357.

GIUSEPPINI, S. & E. CAPANNA, 2010. The Museum of Comparative Anatomy: from Archigymnasium to La Sapienza (1800-1980). **Museologia Scientifica Nuova Serie** 4(1-2): 24-42.

LEPRI, G., 1912. Nota su alcuni *Felis* acquistati dal Museo Zoologico della R. Università di Roma. **Bollettino Società Zoologica Italiana** 3(1): 113-119.

MARANGONI, C. & S. GIPPOLITI, 2011. I Savoia e la zoologia a Roma Capitale. **Bollettino Amici Musei Roma** 25: 55-70.

MARTINO, A. M. & E. CAPANNA, 2002. Chromosome characterization of an endemic South American rodent, *Calomys hummelincki* (Husson, 1960) (Sigmodontinae, Phyllotini). **Caryologia** 55(4): 331-339. DOI: http://doi.org/10.1080/00087114.2002.10797884

MARZAGORA, L. & E. CAPANNA, 2001. Dal Kircheriano alla "Sapienza": i musei universitari nello Stato Pontificio. In: E. LO SARDO (Ed.): **Athanasius Kircher**. Il museo del mondo: 197-205. Edizioni de Luca, Roma.

MASI, L., 1911. Due nuove specie di *Amphisbaena* della Repubblica Argentina. **Bollettino Società Zoologica Italiana** 2(12): 235-240.

MAZZOTTI, S., 2011. **Esploratori perduti**: 1-239. Codice Edizioni, Turin.

MERINO, M. L. & R. V. ROSSI, 2010. Origin, systematics and morphological radiation. In: J. M. B. DUARTE & S. G. IEZ (Ed.): **Neotropical Cervidology**: biology and medicine of Latin American deer: 2-11. IUCN, FUNDEP, Jaboticabal. Available at: https://www.academia.edu/18189004/Neotropical_cervidology_biology_and_medicine_of_latin_American_deer. Accessed on: October 26, 2020.

METAXÀ, T., 1853. **Musei Zoologici Romanae Studiorum Universitatis Catalogus**: vol. 1. Manoscritto Biblioteca Museo Civico di Zoologia, Roma.

NASCIMENTO, F. O. & A. FEIJÓ, 2017. Taxonomic revision of the oncillas *Leopardus tigrinus* (Schreber, 1775) (Carnivora, Felidae). **Papéis Avulsos de Zoologia** 57(19): 231-264. DOI: https://doi.org/10.11606/0031-1049.2017.57.19

PATTON, J. L., U. F. J. PARDIÑAS & G. D'ELÍA (Org.), 2015. **Mammals of South America**: vol. 2: Rodents. The University of Chicago Press, Chicago and London. DOI: http://dx.doi.org/10.7208/chicago/9780226169606.001.0001

PETELLA, G., 1889. La natura e la vita nell'America del Sud. Impressioni di viaggio (prima parte). **Rivista Marittima** 1889: 59-80.

POGGI, R., 2017. 150 years of scientific activity. Notes on the foundation and development of the Museo Civico di Storia Naturale "Giacomo Doria" of Genoa (1867-2017). **Annali Museo Civico Storia Naturale Giacomo Doria Genova** 109: 1-273.

STEINHEIMER, F. D., 2003. Darwin, Rüppell, Landbeck & Co. – important historical collections at the Natural History Museum, Tring. **Bonner Zoologische Beiträge** 51: 175-188.

SUPERINA, M. & A. M. ABBA, 2014. *Dasypus pilosus*. **The IUCN Red List of Threatened Species** 2014: e.T6291A47441122. DOI: https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T6291A47441122.en

THOMAS, O., 1900. List of the mammals obtained by Dr. Franco Grillo in the province of Parana, Brazil. **Annali Museo Civico di Storia Naturale Genova** 2(20): 546-549.

VISALBERGHI, E. & D. M. FRAGASZY, 2013. The EthoCebus Project. Stone tool use by wild capuchin monkeys. In: C. M. SANZ, J. CALL & C. BOESCH (Ed.): **Tool use in animals**: cognition and ecology: 203-222. Cambridge University Press, Cambridge.