

Research articleurn:lsid:zoobank.org:pub:67213318-C4D5-4D11-A0F4-AEF7B416CA39**Revised catalogue of monotremes and marsupials
in the historic mammal collection housed at
Museo Regionale di Scienze Naturali of Torino, Italy****Luca Ghiraldi^{1,*}, Ana Paula Carmignotto², Vera Tosetto³, Sandy Ingleby⁴ & Mark D.B. Eldridge⁵**¹ *Museo Regionale di Scienze Naturali di Torino, Via Giolitti 36, I-10123 Torino, Italy*² *Laboratório de Diversidade Animal, Departamento de Biologia Universidade Federal de São Carlos (UFSCar), Campus Sorocaba, Sorocaba, Brazil*³ *Università degli Studi di Torino, Dipartimento di Scienze della Vita e Biologia dei Sistemi, Via Accademia Albertina 13, I-10123 Torino, Italy*^{4,5} *Australian Museum Research Institute, Australian Museum, 1 William Street, Sydney, NSW 2010, Australia**Corresponding author: Email: luca.ghiraldi@regione.piemonte.it¹ urn:lsid:zoobank.org:author:3556E7BD-C957-4E5E-8CFA-9DA069E34487² urn:lsid:zoobank.org:author:BE376A18-C4E4-4CE8-9F47-1796A8E36A4C³ urn:lsid:zoobank.org:author:28517B1B-EBB2-4470-8A52-EF3B43A43C91⁴ urn:lsid:zoobank.org:author:FED6DBA2-B36A-4855-B16B-7276EA33FAE6⁵ urn:lsid:zoobank.org:author:C42AD8C3-67FB-436E-B191-5BB236287ADF

Abstract. The historic collection of the Museo di Zoologia and of the Museo di Anatomia Comparata of Torino University (Italy), now hosted at Museo Regionale di Scienze Naturali of Torino, contains almost 3000 mammal specimens, in addition to 200 almost complete skeletons and an undefined number of skeletal units. The present work, which is part of a larger project whose aim is to make a complete revision of the specimens still present in the historic collection, was focused on the 135 specimens of monotremes and marsupials, mainly represented by mounted skins, flat skins, and osteological material composed of 12 skeletons and 32 skulls. The study allowed in addition to the implementation of a new revised catalogue, the update of the taxonomic nomenclature and a new determination of 32 specimens and 18 skeletal units. Overall, the monotremes and marsupials in the collection represent 58 species, with some of high scientific value; this is the case of some extinct species such as: Thylacine (*Thylacinus cynocephalus* Harris, 1808), Eastern Hare-Wallaby (*Lagorchestes leporides* (Gould, 1841)) and the Crescent Naitail Wallaby (*Onychogalea lunata* (Gould, 1841)). Unfortunately, it was not possible to reach the species level with certainty for 28 specimens due to their bad state of preservation, the loss of the original labels, the lack of detailed collecting data or because of the juvenile or immature stage of development.

Key words. Ameridelphia, Australidelphia, Monotremata, Natural History Collections, Biodiversity.

INTRODUCTION

Natural history museums and their biological collections play a fundamental role in disseminating knowledge and understanding of the earth's biodiversity (Grande 2017; Kemp 2017). The wealth of specimens preserved in these collections have always had an important educational role, providing data concerning the biology, ecology and conservation of species, but also serve as major sources of biological data for scientists. As such they represent records of inestimable value, providing multidimensional documentation in geographic and biodiversity space, and position in time (Winker 2004). They are invaluable resources to scientific studies, permitting comparative analyses in terms of phenotypic change, abundance and/or distribution. It is therefore of the utmost importance to publish inventories with all related information in order

to make the scientific community aware of the existence of such biological heritage.

The present study, which is part of a larger project, whose final purpose is to make a revised catalogue of all the specimens preserved in the MRSN (Museo Regionale di Scienze Naturali) of Torino (NW Italy), including those coming from the historic mammal collections of the MZUT (Museo di Zoologia dell'Università di Torino) and the MACUT (Museo di Anatomia Comparata dell'Università di Torino). This was necessary for three important reasons:

1) Reduced interest in the museum specimens has meant zoological studies involving taxonomic analysis of the voucher materials preserved in the collections are no longer undertaken.

2) Unlike other groups, the MZUT and MACUT mammal collections lacked specialized curatorial staff and

consequently part of the collection has not yet been studied and the taxonomic status of such material is, as already pointed out by Tadini (1937), in many cases still indeterminated.

3) The numerous relocations to which the collection has been subjected over time, and the problems connected with its preservation, have contributed to the loss and the deterioration of many specimens (Tortonesi 1957) and to the loss of original data from several specimens, which currently have incomplete or no associated information regarding their provenance.

The present work, which aims to overcome these issues is the third contribution after those published by Passeirín d'Entrèves & Gavetti (2014) on the cetaceans and by Calvini et al. (2016) on the primates.

The monotremes and marsupials in the mammal historic collection

The MZUT mammal collection includes about 3,000 specimens, most of which are mounts; several hundred are preserved as flat skins, whereas most of the small mammals, in particular bats and small rodents, are kept in ethanol. In addition, in the MACUT osteological collection there are approximately 200 almost complete skeletons, to which an undefined number of skulls and individual skeletal units from a large number of heterogeneous species can be added. Among them, the specimens of monotremes and marsupials represent only a minor part, but they are also the ones that have been never investigated with the exception of a single report in the work of Thomas (1898). These specimens arrived in the museum mainly between 1819 and 1899 and are the results of the contributions of several scientific expeditions. This includes the material collected and purchased in Brazil by Antonio Caffer, assistant at the zoology section of the Royal zoological museum of Torino, engaged as member of the scientific staff during the voyage of the “Fregata Regina” (1839–1840); by Enrico Giglioli from the museums of Melbourne and Sydney (Australia) during the three year (1865–1868) voyage around the Globe of the Italian warship “Pirocorvetta Magenta” (Hyller Giglioli 1876); by Enrico Festa during his four year expedition (1895–1898) in Panama and Ecuador; and by Alfredo Borelli who travelled in Argentina, Paraguay, Brazil and Bolivia between 1893–1896.

The number of specimens was also enhanced with the contribution of the Royal Zoological Gardens of Torino and Stupinigi (Corti 1955; Maschetti et al. 1988), and due to acquisitions from other collectors not directly related to the Torino Museum, as well as from different European animal dealers. In many cases during the preparation of the skins, the skeletons, or part of them, were also preserved in order to increase the osteological collection which was mostly used for scientific purposes.

MATERIAL AND METHODS

The first phase of the work was to find as much information as possible associated with each specimen. Three major archival sources were used: two old manuscript catalogues of the mammals (MZUT) and osteological (MACUT) collections and a degree thesis realized by Tadini in 1937, which reports all the specimens preserved at that time.

The second step was to carry out a complete revision and taxonomic update for all the specimens of monotremes and marsupials still present in the collections. As there continues to be some disagreement about the classification of marsupials, it was decided for the Australasian species to follow the nomenclature of the Handbook of the Mammals of the World (Wilson & Mittermeier 2015); whereas for the South American opossum species we followed the nomenclature, taxonomy and geographic distribution used in the general works of Gardner (2008), Voss & Jansa (2009), and Astúa (2015), as well as more recent work for specific genera such as Giarla et al. (2010) for *Thylamys* Gray, 1843; Rossi et al. (2010) and Voss et al. (2014) for *Marmosa* Gray, 1821; Voss et al. (2018) for *Philander* Brisson, 1762; and Voss et al. (2019) for *Metachirus* Burmeister, 1854. The popular names and threat categories follow IUCN (2020). For species recently described or revalidated, no IUCN category was provided, since these taxa were not yet evaluated under IUCN criteria.

Along with this second step, skins and skulls were photographed in high resolution in order to be examined, whereas for the Ameridelphia osteological materials the skulls measurement (Fig. 1, Table 1) have also been taken to aid in the taxonomic identification following the methodology of Cerqueira & Lemos (2000). In addition, the skulls were also classified in age classes based on the criteria of tooth eruption of Rossi et al. (2010), being treated as juveniles (age classes 1 to 4) when the permanent dentition are not fully erupted, as subadults (age class 5) when the third non-deciduous premolars are not fully erupted, and as adults (age class 6) when all permanent tooth are fully erupted and in place.

The third step was the creation of a catalogue, which largely follows the structure proposed by Calvini et al. (2016) where all the specimens have a unique identification code that replaces all the previous ones (which are reported, if present, in parentheses). It begins with the acronym MZUT followed by the letter T (theriology) and a progressive number. If for a given specimen the skeleton, or part of it, can be recognized, it will have the same code as the specimen. Separated by semicolons are the method of preservation: mount, unmount (previously mounted), skin, ethanol; sex and age (if available); origin, date of the arrival in museum, the name of the person who bestowed the specimens in museum and lastly (if necessary) some additional notes reported in the manuscript

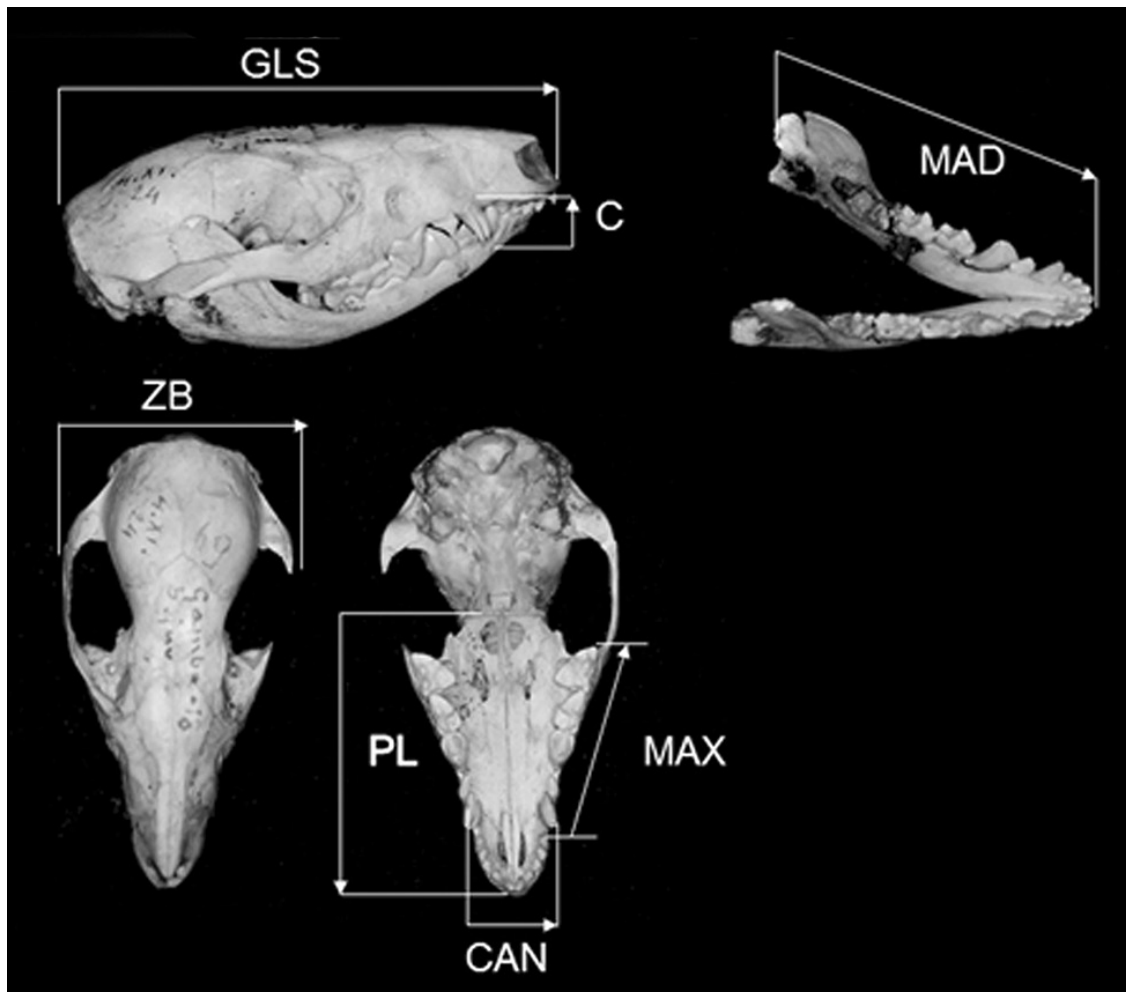


Fig. 1. Seven cranio-dental measurements taken on *Didelphimorphia* marsupial skulls based on the work of Cerqueira & Lemos (2000).

Table 1. Cranio-dental measurements (mm) of sub-adult (sub) and adult (ad) specimens of *Didelphimorphia* marsupials housed in the historic mammal collection of the Torino University.

Species	MZUT	Age	Sex	GLS	ZB	PL	MAX	C	CAN	MAD
<i>Caluromys derbianus</i>	T417	ad	female	59.4	33.2	32.8	21.3	8.6	11.4	44.7
<i>Caluromys derbianus</i>	T422	ad	female	57.4	32.7	33.7	21.4	7.1	11.9	43.0
<i>Caluromys derbianus</i>	T424	ad	female	56.2	32.5	33.0	21.4	6.0	11.7	41.7
<i>Chironectes minimus</i>	T428	ad	—	107.1	62.2	62.1	41.6	16.9	21.8	86.5
<i>Didelphis albiventris</i>	T433	sub	—	77.8	39.6	50.0	35.0	7.2	12.9	62.3
<i>Didelphis aurita</i>	T435	ad	—	90.0	45.3	56.4	37.8	11.8	16.1	69.4
<i>Didelphis marsupialis</i>	T439	ad	female	94.2	51.8	67.1	44.5	10.7	18.3	86.6
<i>Didelphis marsupialis</i>	T440	ad	—	120.5	60.5	67.9	43.6	17.9	22.0	92.9
<i>Didelphis pernigra</i>	T442	sub	—	84.5	40.3	53.3	34.0	8.8	14.0	68.0
<i>Lutreolina crassicaudata</i>	T446	ad	—	76.0	42.7	41.4	29.4	8.8	14.5	60.0
<i>Philander melanurus</i>	T449	ad	male	86.7	34.6	40.1	27.3	7.2	10.3	53.0
<i>Didelphis</i> sp.	T459	ad	—	107.5	50.7	64.2	41.8	17.9	22.0	84.0
<i>Didelphis</i> sp.	T460	ad	—	101.1	50.0	62.1	40.0	9.9	18.0	79.9
<i>Didelphis</i> sp.	T461	ad	male	104.4	—	63.0	40.4	15.0	15.0	84.0
<i>Didelphis</i> sp.	T462	ad	—	96.8	47.9	59.9	41.4	11.7	16.0	78.3
<i>Didelphis</i> sp.	T463	sub	—	92.3	46.6	55.2	36.2	10.7	15.7	74.0
<i>Didelphis</i> sp.	T464	ad	male	102.5	55.3	62.2	41.1	12.8	17.9	84.4

catalogues or other explicative notes. If the specimens have no reference the acronym w.d. (without data) was used. On the same row where there is the name of the species, the IUCN category has been reported.

Institutional abbreviations

IUCN = International Union for Conservation of Nature
 MZUT = Museo di Zoologia dell'Università di Torino, Italy
 MACUT = Museo di Anatomia Comparata dell'Università di Torino, Italy

Abbreviations of threat categories (IUCN 2020)

LC = least concern
 NT = near threatened
 VU = vulnerable
 EN = endangered
 CR = critically endangered
 EX = extinct

Abbreviations for morphological terms used in the text and the figures

CAN = distance between canines
 C = canine height
 GLS = greatest length of the skull
 MAD = mandibular length
 MAX = maximum Length of tooth row
 PL = palatal length
 ZB = zygomatic breadth

RESULTS AND DISCUSSION

Overall, the historic catalogue of mammals reported 120 marsupial and eight monotreme specimens, whereas Tadini (1937) recorded 126 marsupials, without including 14 specimens collected by Enrico Festa, and eight monotreme specimens. In contrast, our inventory recorded a total of 135 specimens. These comprise eight monotremes and 127 specimens of marsupials, of which 37 (15 mounted, 21 flat skins, one in ethanol) are from South America, one from North America (mounted), one from Timor (mounted) and two from Celebes (now known as Sulawesi) (mounted), while the remaining 87 (78 mounted, four skins, five in ethanol) are from Australia and nearby islands.

As regards the osteological materials the old catalogue reported 15 complete skeletons (one without skull) and 36 skulls. Our inventory documents 12 (two monotems; two Ameridelphia) complete or partial skeletons and 32 (28 Ameridelphia) skulls, almost all undetermined.

This work has resulted in an update of the taxonomic nomenclature and a new determination of 32 specimens and 18 skeletal units. Overall, the monotremes and marsupials in the collection represent 58 taxa, with some of them of high scientific value because they are now extinct, such as: Thylacine *Thylacinus cynocephalus* Harris, 1808 (Fig. 3), Crescent Nailtail Wallaby *Onychogalea lunata* (Gould, 1841) (Fig. 6), Eastern Hare-wallaby *Lagorchestes leporides* Gould, 1841 (Fig. 5) or very rare such as the Western Long-Beaked Echidna *Zaglossus bruijnii* (Peters & Doria, 1876) (Fig. 2) and the Woylie *Bettongia penicillata* Gray, 1837 (Fig. 4).

Unfortunately, it was not possible to identify 28 specimens to species level with certainty because of the fading of their original colours or their bad state of conservation. Moreover, some specimens are young or not completely mature, and a definite determination could not be made without observing the complete dentition and well-developed cranial structures or the use of biomolecular techniques. Furthermore, some skulls also lack the provenance, which is very important for some morphologically similar species under genera such as *Didelphis*.

COMMENTED CATALOGUE

Order **MONOTREMATA** Bonaparte, 1837
 Family **TACHYGLOSSIDAE** Gill, 1872

Genus *Zaglossus* Gill, 1877

WESTERN LONG-BEAKED ECHIDNA *Zaglossus bruijnii* (Peters & Doria, 1876) (**CR**)

MZUT T405 (1010); mount; unsexed ad.; Torres Strait, Australia; 1866; Voyage of the Pirocorvetta "Magenta", donation by Mr. Teijsman.

Remarks: The specimen was obtained during the circumnavigation voyage by the Italian Warship *Magenta*. On 2 May 1866, Enrico H. Giglioli and Filippo Defilippi visited the Botanical Garden of Bogor (Java, Indonesia), where its Director Johannes Elias Teijsmann (1808-1882) gave them some specimens of "rare animals" (Giglioli 1876).

Genus *Tachyglossus* Illiger, 1811

SHORT-BEAKED ECHIDNA *Tachyglossus aculeatus* (Shaw, 1792) (**LC**)

MZUT T406 (897); mount; unsexed ad.; Tasmania, Australia; I/1861; exchange with Ercole Turati from Milano;

MZUT T407 (540); mount; unsexed; Tasmania, Australia;

MZUT T408 (MACUT 326); skeleton; w.d.

Remarks: Count Ercole Turati (1829-1881) was a banker and a passionate naturalist based in Milano (Italy). He purchased and exchanged many natural history



Fig. 2. MZUT T405 specimen of Western Long-Beaked Echidna *Zaglossus bruijnii*.

specimens and built up a very large private collection, in particular of birds (more than 20,000 specimens) which, after his death, were donated to the Natural History Museum of Milano. Unfortunately, after the bombing in 1943, the collection was almost completely destroyed.

Family **ORNITHORHYNCHIDAE** Gray, 1825

Genus *Ornithorhynchus* Blumenbach, 1800

PLATYPUS *Ornithorhynchus anatinus* (Shaw, 1799) (NT)

MZUT T409 (541); mount; male ad.; river near Port Jackson, New South Wales, Australia; 1819; donation by Mr. Mackay;

MZUT T410 (1335); mount; unsexed ad.; no locality; I/1892; donation by Mr. Giglio Giuseppe;

MZUT T411 (1562); mount; male ad.; no locality; 1899; donation by Carlo Bajnotti;

MZUT T412 (1858); mount; unsexed; no locality; 1905; donation by Mr. Chiotti;

MZUT T413 (2756); mount; unsexed ad.; Melbourne, Victoria, Australia; 1927; donation by Count Teofilo Rossi of Montelera;

MZUT T414 (MACUT 325); skeleton; w.d.

Remarks: James Townsend Mackay was the curator of the botanical garden of the Trinity College (Dublin, Ireland) and associate of Linnean Society of London.

The MZUT catalogue reports for the specimen MZUT T409 the following note “the specimen through its spur

caused the loss of a soldier’s arm who wanted to take him alive”.

Carlo Bajnotti (1868-1942) was a passionate traveller and naturalist who worked as taxidermist for the Royal Zoological Museum of Torino (Simondetti 1943).

Mr. Chiotti was ship’s purser of the warship “Liguria”, captained by His Majesty Luigi Amedeo di Savoia, Duke of the Abruzzi during his journey around the globe in the years 1902–1904.

Teofilo Rossi di Montalera (1865-1927) was an entrepreneur, a politician of the Kingdom of Italy and office of Mayor of the City of Torino up to 1917.

Order **DIDELPHIMORPHIA** Gill, 1872

Family **DIDELPHIDAE** Gray, 1821

Genus *Caluromys* J.A. Allen, 1900

CENTRAL AMERICAN WOOLLY OPOSSUM *Caluromys derbianus* (Waterhouse, 1841) (LC)

MZUT T415; skin; unsexed ad.; Vinces, Ecuador, IX/1897; Festa expedition; (voucher number 89);

MZUT T415 (MACUT 4683); partial skull;

MZUT T416; skin; female ad.; Vinces, Ecuador, IX/1897; Festa expedition (voucher number 123);

MZUT T416 (MACUT 4736); partial skull;

MZUT T417; skin; female ad.; Vinces, Ecuador, IX/1897; Festa expedition (voucher number 125);

MZUT T417 (MACUT 4680); skull;

MZUT T418; skin; unsexed juv.; Vinces, Ecuador, IX/1897 Festa expedition (voucher number 1251);
 MZUT T419; skin; unsexed juv.; Vinces, Ecuador, IX/1897; Festa expedition (voucher number 1283);
 MZUT T420; skin; unsexed juv.; Vinces, Ecuador, IX/1897 Festa expedition (voucher number 1284);
 MZUT T421; skin; unsexed juv.; Vinces, Ecuador, IX/1897 Festa expedition (voucher number 1292);
 MZUT T422; skin; female ad.; Vinces, Ecuador, IX/1897; Festa expedition (voucher number 90);
 MZUT T422 (MACUT 4677); skull;
 MZUT T423; skin; female ad.; Vinces, Ecuador, IX/1897 Festa expedition (voucher number 121);
 MZUT T423 (MACUT 4675); skull;
 MZUT 424; skin; female ad.; Vinces, Ecuador, IX/1897; Festa expedition (voucher number 122);
 MZUT T424 (MACUT 4681); skull.

Remarks: All the skins and skulls were undetermined, and only the skulls were reported in the MACUT catalogue.

Genus *Marmosa* Gray, 1821

ISTHMIAN MOUSE OPOSSUM *Marmosa isthmica* Goldman, 1912 (**Not Evaluated**)

MZUT T425, skin; unsexed ad.; Vinces, Ecuador, IX/1897; Festa expedition (voucher number 114).

Remarks: The specimen was undetermined and not reported in the MZUT catalogue.

LINNAEUS'S MOUSE OPOSSUM *Marmosa murina* (Linnaeus, 1758) (**LC**)

MZUT T426 (693); mount; male ad.; Suriname; 1845; purchased by G.A. Frank.

Remarks: Gustav Adolph Frank was a natural history dealer based in Amsterdam.

Genus *Metachirus* Burmeister, 1854

BROWN FOUR-EYED OPOSSUM *Metachirus myosuros* (Temminck, 1824) (**Not Evaluated**)

MZUT T427 (347); mount; unsexed ad.; Rio de Janeiro (Brazil); 1839; Antonio Caffer expedition.

Genus *Chironectes* Illiger, 1811

WATER OPOSSUM *Chironectes minimus* (Zimmermann, 1780) (**LC**)

MZUT T428 (MACUT 7718); skull; unsexed ad.; Brazil; 24/IX/1914; donation by Alfonso Bovero.

Remarks: Professor Alfonso Bovero (1872-1937) was an Italian medical doctor. In 1912 he moved to Brazil where he got the chair of anatomy and histology at the Faculty of Medicine and Surgery of São Paulo University. He was also the founder of the Anatomy museum of the São Paulo University.

Genus *Didelphis* Linnaeus, 1758

WHITE-EARED OPOSSUM *Didelphis albiventris* Lund, 1840 (**LC**)

MZUT T429 (1386); mount; unsexed ad.; Luque, Paraguay, VIII/1893; Borelli expedition;
 MZUT T429 (MACUT 3731); partial skull;
 MZUT T430 (1387); mount; unsexed ad.; Luque, Paraguay, 1893; Borelli expedition;
 MZUT T430 (MACUT 3508); partial skull;
 MZUT T431 (1899); ethanol; unsexed juv.; Corrientes, Argentina; 1893; Borelli expedition;
 MZUT T432 (2769); mount; unsexed juv.; Argentina, 1928; donation by Principe di Piemonte;
 MZUT T433 (MACUT 10035); skull; unsexed subad.; Brazil; 05/V/1921; donation by Alfonso Bovero.

Remarks: The specimens MZUT T431 and MZUT T433 were undetermined, MZUT T433 is not reported in the MACUT catalogue.

BRAZILIAN COMMON OPOSSUM *Didelphis aurita* Wied-Neuwied, 1826 (**LC**)

MZUT T434 (338); mount; unsexed ad.; near Rio de Janeiro (Brazil); 1839; Antonio Caffer expedition;
 MZUT T434 (MACUT 338); skeleton;
 MZUT T435 (MACUT 7736); skull; unsexed ad.; Brasil; 15/V/1919; donation by Alfonso Bovero.

Remarks: In the MZUT catalogue the specimen MZUT T434 was reported as *Didelphis albiventris*, but since it presents dark face and ears, it was redetermined as *D. aurita*. The MZUT T435 was undetermined. See also the skull measurements in Table 1.

BLACK-EARED OPOSSUM *Didelphis marsupialis* Linnaeus, 1758 (**LC**)

MZUT T436 (694); mount; unsexed juv.; Suriname; 1845; purchased by G.A. Frank;
 MZUT T437; skin; unsexed ad.; Vinces, Ecuador; IX/1897; Festa expedition (voucher number 93);
 MZUT T438; skin; female ad.; Vinces, Ecuador; IX/1897; Festa expedition (voucher number 109);
 MZUT T438 (MACUT 4666); skull;
 MZUT T439 (1425); mount; unsexed ad.; Punta de Sabana, Darien, Panama; 1895; Festa expedition;
 MZUT T439 (MACUT 3777); skull;
 MZUT T440 (MACUT 3628); skull; female ad.; Darien (Ecuador); 1896 Festa expedition;
 MZUT T441 (MACUT 7733); skull; unsexed ad.; Brazil; no date; donation by Alfonso Bovero.

Remarks: The specimen MZUT T436 was identified as *Marmosa murina*, but it was redetermined as *Didelphis marsupialis* due to its dorsal dark pelage, with long white guard hairs, extending well beyond the base of the tail, which is large and bicolored in the distal portion. The dark face and black ears also points to this species. The specimens MZUT T437 and 438 was undetermined

and not reported in the MZUT catalogue. The specimen MZUT T439 was undetermined.

The specimen MZUT T440 was identified as *Chironectes minimus*, but the morphological qualitative and quantitative characters of the skull lead to redetermination as *D. marsupialis* (see Cerqueira & Lemos 2000; Voss & Jansa 2009). See also the skull measurements in Table 1. The skull MZUT T440 was undetermined.

ANDEAN WHITE-EARED OPOSSUM *Didelphis pernigra* J.A. Allen, 1900 (LC)

MZUT T442; skin; unsexed ad.; Ibarra, Ecuador, XII/1896; Festa expedition (voucher number 67); MZUT T442 (MACUT 4678); partial skull; MZUT T443; skin; unsexed subad.; Quito, Ecuador, XII/1896; Festa expedition (voucher number 69); MZUT T443 (MACUT 4667); skull.

Remarks: All the skins were undetermined and not reported in the MZUT catalogue. The skulls MZUT T442 and T443 were undetermined.

VIRGINIA OPOSSUM *Didelphis virginiana* Kerr, 1792 (LC)

MZUT T444 (331); mount; unsexed ad.; North America; 1823; donation by Gaspare Deabbate; MZUT T445 (MACUT 321); skeleton; w.d.; MZUT T446 (MACUT 337); skull; juv.; w.d.

Remarks: Gaspare Deabbate was the General Consul of the Sardinian Kingdom in Philadelphia (Pennsylvania, USA).

Genus *Lutreolina* Thomas, 1910

LITTLE WATER OPOSSUM *Lutreolina crassicaudata* (Desmarest, 1804) (LC)

MZUT T447 (MACUT 4539); skull; unsexed ad.; w.d.; MZUT T448 (MACUT 3472); skull; unsexed ad.; no locality; 1896; collected by Crivelli.

Remarks: MZUT T447 was undetermined; MZUT T448 was labelled as *Didelphis* sp., but the morphological qualitative and quantitative characters of the skull lead to redetermination as *Lutreolina crassicaudata* (see Voss & Jansa 2009). See also the skull measurements in Table 1.

We didn't find any information about Mr. Crivelli.

Genus *Philander* Brisson, 1762

BLACK FOUR-EYED OPOSSUM *Philander melanurus* (Thomas, 1899) (Not Evaluated)

MZUT T449; skin; unsexed ad.; Vices, Ecuador; IX/1897; Festa expedition (voucher number 110); MZUT T450; skin; male ad.; Vices, Ecuador; IX/1897; Festa expedition (voucher number 116); MZUT T450 (MACUT 4676); skull.

Remarks: The specimens MZUT T449 and T450 were undetermined and are not reported in the MZUT catalogue. The skull MZUT T450 was undetermined.

GRAY FOUR-EYED OPOSSUM *Philander opossum* (Linnaeus, 1758) (LC)

MZUT T451 (341); mount; female ad.; Cayenne (French Guyana); 10/IV/1899; donation by Mr. Bacle; MZUT T452 (342); mount; male ad.; Cayenne (French Guyana); 10/IV/1899; donation by Mr. Bacle; *Remarks:* We didn't find any information about Mr. Bacle.

SOUTHEASTERN FOUR-EYED OPOSSUM *Philander quica* (Temminck, 1824) (LC)

MZUT T453 (335); mount; unsexed ad.; Rio de Janeiro, Brazil; 1839; Caffer expedition; MZUT T454 (336); mount; unsexed ad.; Rio de Janeiro, Brazil; 1839; Caffer expedition.

Genus *Thylamys* Gray, 1843

ELEGANT FAT-TAILED MOUSE OPOSSUM *Thylamys elegans* (Waterhouse, 1839) (LC)

MZUT T455 (735); skin; unsexed ad.; Valparaíso, Chile; 1845; purchased by G.A. Frank; MZUT T456 (840); skin; unsexed ad.; Chile; 1849; Piccollet d'Hermillon; MZUT T457 (2935); skin; male ad.; Quilpué, Chile; no date; donation by Enrico Festa (the specimen was originally part of Francisco Videla collection).

Remarks: Auguste Piccollet d'Hermillon was the General Consul of Kingdom of Sardinia in Valparaíso, Chile.

UNDETERMINED SPECIMENS

Didelphis sp.

MZUT T458 (2643); partial skin; unsexed; Villa Cortina?; II/1891; MZUT T459 (MACUT 7734); skull; unsexed ad.; Brazil; no date; donation by Alfonso Bovero; MZUT T460 (MACUT 7735); skull; unsexed ad.; Brazil; no date; donation by Alfonso Bovero; MZUT T461 (MACUT 10036); skull; male ad.; Brazil; 25/X/1921; donation by Alfonso Bovero; MZUT T462 (MACUT 10037); skull; unsexed ad.; Brazil; 1921; donation by Alfonso Bovero; MZUT T463 (MACUT 10038); skull; unsexed subad.; Brazil; IV/1918; donation by Alfonso Bovero; MZUT T464 (MACUT 10039); skull; male ad.; Brazil; 28/IX/1921; collected by Dr. Y. Karimi; MZUT T465 (MACUT 10040); skull; unsexed juv.; Brazil; 04/XI/1924.

Remarks: The specimen MZUT T 458 is from the genus *Didelphis*, and since it presents dark face and black ears, it could be identified as *D. aurita*, if it proves to come from Atlantic Forest of Brazil or *D. marsupialis* if it came from Amazonian Forests.

The specimens from MZUT T459 to MZUT T465 present skulls from the genus *Didelphis* and by their measurements (see Table 1) they are probably specimens

from black-eared opossums, *D. aurita* or *D. marsupialis* (see Cerqueira & Lemos 2000).

Didelphis cf. imperfecta

MZUT T466 (332); mount; female ad.; Cayenne (French Guyana); 1810; purchased in Paris by Franco Andrea Bonelli;

MZUT T467 (333); mount; unsexed juv.; Cayenne (French Guyana); 1822; from Mr. Banon.

Remarks: The specimens MZUT T466 and 467, previously cited as *D. marsupialis*, could not be identified at species level due to the faded coloration of the skins. But since they present whiter faces, they could be, instead, representatives of *D. imperfecta*.

Order **DASYUROMORPHIA** Gill, 1872

Family **DASYURIDAE** Goldfuss, 1820

Genus *Antechinus* Macleay, 1841

YELLOW-FOOTED ANTECHINUS *Antechinus flavipes* (Waterhouse, 1838) (LC)

MZUT T468 (548); unmount; unsexed ad.; New South Wales, Australia; 1856; purchased by G.A. Frank.

DUSKY ANTECHINUS *Antechinus swainsonii* (Waterhouse, 1840) (LC)

MZUT T469 (715); mount; unsexed ad.; Van Diemen Land (Tasmania), Australia; V/1845; purchased by G.A. Frank.

Genus *Dasyurus* É. Geoffroy, 1796

WESTERN QUOLL *Dasyurus geoffroyi* Gould, 1841 (NT)

MZUT T470 (889); mount; female ad.; Australia; 1860; purchased by Verreaux;

MZUT T471 (837); mount; unsexed ad.; Australia; 1848; purchased in Milano (Italy).

Remarks: Mr. Verreaux was a professional collector of and trade in natural history based in Paris.

SPOTTED-TAILED QUOLL *Dasyurus maculatus* (Kerr, 1792) (NT)

MZUT T472 (550); mount; w.d.

Remarks: The specimen lacks the tail.

EASTERN QUOLL *Dasyurus viverrinus* (Shaw, 1800) (EN)

MZUT T473; mount; unsexed ad.; Tasmania, Australia; II/1867;

MZUT T474 (354); mount; unsexed ad.; Australia; 1839; purchased in Rio de Janeiro by Antonio Caffer;

MZUT T475 (899); mount; unsexed ad.; Australia; 1860; purchased by Verreaux.

Genus *Phascogale* Temminck, 1824

BRUSH-TAILED PHASCOGALE *Phascogale tapoatafa* (Meyer, 1793) (NT)

MZUT T476 (695); mount; unsexed ad.; Australia; 1829.

Genus *Sminthopsis* Thomas, 1887

FAT-TAILED DUNNART *Sminthopsis crassicaudata* (Gould, 1844) (LC)

MZUT T477 (2042); ethanol; unsexed, ad., Southern Australia; no date; donation by Oldfield Thomas.

Remarks: Michael Rogers Oldfield Thomas was a British zoologist who worked on the mammal collections at the Natural History Museum of London.

Family **MYRMECOBIIDAE** Waterhouse, 1841

Genus *Myrmecobius* Waterhouse, 1836

NUMBAT *Myrmecobius fasciatus* Waterhouse, 1836 (EN)

MZUT T478 (687); mount; female ad.; York district, Western Australia; VII/1844; donation by Mr. Preiss

MZUT T479 (699); mount; male ad.; Australia; I/1845; purchased by G.A. Frank.

Remarks: The MZUT catalogue reports that the specimen MZUT T478 was killed on 10/04/1840.

Johann August Ludwig Preiss (1811-1883) was a German naturalist mainly interested in plant collection, but he made extensive collections of natural history specimens of all kinds. In the course of his activities he visited from 1838 to 1841 most of the known parts of southwestern Australia and several islands off the coast. Most of his zoological collection was sold to various European museums, or dealers of natural history specimens.

Family **THYLACINIDAE** Bonaparte, 1838

Genus *Thylacinus* Temminck, 1824

TASMANIAN TIGER *Thylacinus cynocephalus* Harris, 1808 (EX)

MZUT T480 (352); mount; male ad.; Tasmania, Australia; 1831; purchased by Mr. Leadbeater;

MZUT T480 (MACUT 331); partial skeleton.

Remarks: The skull is inside the taxidermy mount. Benjamin Leadbeater was a renowned merchant of natural history materials in London.

Order **PERAMELEMORPHIA** Ameghino, 1889

Family **PERAMELIDAE** Gray, 1825

Genus *Isoodon* (Desmarest, 1817)

SOUTHERN BROWN BANDICOOT *Isoodon obesulus* (Shaw, 1797) (LC)

MZUT T481 (691); mount; female ad.; Australia; VII/1844; donation by Mr. Preiss.

Remarks: The specimen was killed on 4/VI/1839.

Genus *Perameles* É. Geoffroy, 1804

LONG-NOSED BANDICOOT *Perameles nasuta* Geoffroy, 1804 (LC)

MZUT T482 (829); mount; female ad.; Australia; 1848; purchased in Milano by Mr. Bonomi.

Family **THYLACOMYIDAE** Bensley, 1903

Genus *Macrotis* Reid, 1837

GREATER BILBY *Macrotis lagotis* Reid, 1837 (VU)

MZUT T483 (848); mount; unsexed ad.; Australia; 1850; purchased in Milano by Mr. Bonomi.

Order **DIPROTODONTIA** Owen, 1866

Family **PHASCOLARCTIDAE** Owen, 1839

Genus *Phascolarctos* Blainville, 1816

KOALA *Phascolarctos cinereus* Goldfuss, 1817 (VU)

MZUT T484 (360); mount; unsexed juv.; Australia; 1839–1840; purchased in Rio de Janeiro by Antonio Caffer;

MZUT T485 (898); mount; unsexed ad.; Australia; exchange with Count Ercole Turati from Milan (Italy);

MZUT T486 (964); mount; w.d.;

MZUT T487; skin; unsexed ad.; Gosford, New South Wales, Australia; 1893; donation by G. Podenzana.

Remarks: Giovanni Podenzana (1864–1943) was an Italian naturalist, explorer and ethnographer. During the last decade of XIX. century he travelled in Australia, Tasmania where he gathered numerous ethnographic artifacts for the Museo Civico of La Spezia (Italy), but also zoological and botanical specimens who enriched the collections of several Italian museums.

Family **VOMBATIDAE** Burnett, 1829

Genus *Vombatus* É. Geoffroy, 1803

WOMBAT *Vombatus ursinus ursinus* (Shaw, 1800) (LC)

MZUT T488 (714); mount; unsexed ad.; islands of the Bass Strait, Australia, VIII/ 1845, purchased by G.A. Frank.

Family **PHALANGERIDAE** Thomas, 1888

Genus *Phalanger* Storr, 1780

NORTHERN COMMON CUSCUS *Phalanger orientalis* (Pallas, 1766) (LC)

MZUT T489 (800); mount; unsexed ad.; Indonesia, Timor Island, 1845; purchased by G.A. Frank;

MZUT T490 (799); mount; unsexed ad.; Indonesia, Timor Island, 1845; purchased by G.A. Frank.

Remarks: The specimen MZUT T489 is albino variety.

Genus *Trichosurus* (Lesson, 1828)

COMMON BRUSHTAIL POSSUM *Trichosurus vulpecula* (Kerr, 1792) (LC)

MZUT T491 (2268); mount; unsexed ad.; Australia; donation by Mr. Gallardo;

MZUT T491 (MACUT 7051); skeleton;

MZUT T492 (704); mount; unsexed ad.; 1845; Australia; purchased by G.A. Frank;

MZUT T493 (679); mount; unsexed ad.; eastern coast of Australia, I/1844; donation by Dr. Ricord;

MZUT T494 (807); mount; unsexed ad.; Australia; 1845; purchased by G.A. Frank;



Fig. 3. MZUT T480 specimen of Tasmanian Tiger *Thylacinus cynocephalus*.

MZUT T495; skin; unsexed ad.; Gosford, New South Wales, Australia; 1893; donation by G. Podenzana; MZUT T496 (MACUT 7868); skeleton; w.d.

Remarks: The specimens MZUT T491 and MZUT T496 were undetermined.

The specimen MZUT T494 is albino variety.

Alexandre Ricord (1798-1876) was an assistant surgeon who devoted his life to natural history. He travelled in tropical America between 1826 and 1834, collecting many zoological specimens.

We didn't find any information about Mr. Gallardo.

Family **PSEUDOCHEIRIDAE** Winge, 1893

Genus *Pseudocheirus* Ogilby, 1837

COMMON RINGTAIL POSSUM *Pseudocheirus peregrinus* (Boddaert, 1785) (LC)

MZUT T497; mount; unsexed ad.; w.d.;

MZUT T498 (801); mount; unsexed juv.; Australia; 1845; purchased by G.A. Frank;

MZUT T499 (355); mount; unsexed ad.; Australia; 1839; purchased in Rio de Janeiro by Antonio Caffer.

Remarks: The specimen MZUT T497 was undetermined.

Genus *Petauroides* Thomas, 1888

GREATER GLIDER *Petauroides volans* (Kerr, 1792) (VU)

MZUT T500 (358); mount; female ad.; Australia;

MZUT T501 (705); mount; unsexed ad.; Australia; 1843; donation by Dr. Ricord;

MZUT T502 (876); mount; unsexed ad.; Australia; no date; from Royal Armory of His Majesty.

Family **PETAURIDAE** Bonaparte, 1838

Genus *Petaurus* Shaw, 1791

YELLOW-BELLIED GLIDER *Petaurus australis* Shaw, 1791 (NT)

MZUT T503 (884); mount; female ad.; Australia; 1860; purchased by Verraux;

MZUT T504; skin; unsexed ad.; Gosford, New South Wales, Australia; 1893; by G. Podenzana.



Fig. 4. MZUT T512 specimen of Wolye *Bettongia penicillata*.

SUGAR GLIDER *Petaurus breviceps* Waterhouse, 1839 (LC)

MZUT T505 (1051); mount; unsexed ad.; Melbourne, Victoria, Australia; donation by Mr. Cossu.

Remarks: Carlo Cossu was the vice-consul of the Kingdom of Italy in Melbourne between the years 1864 and 1870.

Family **TARSIPEDIDAE** Gervais & Verreaux, 1842

Genus *Tarsipes* Gervais & Verreaux, 1842

HONEY POSSUM *Tarsipes rostratus* Gervais & Verreaux, 1842 (LC)

MZUT T506 (688); mount; female ad.; King George III Bay, Western Australia, Australia; VII/1844; donation by Mr. Preiss;

MZUT T507 (256); mount; unsexed ad.; Australia; IX/1846; purchased from G.A. Frank.

Remarks: The MZUT catalogue reports that specimen MZUT T506 was killed XI/1840.

Family **ACROBATIDAE** Aplin, 1987

Genus *Acrobates* Desmarest, 1818

FEATHERTAIL GLIDER *Acrobates pygmaeus* Shaw, 1793 (LC)

MZUT T508 (3138); ethanol; unsexed ad.; Australia; donation by Enrico Festa;

MZUT T509 (2043); ethanol; unsexed ad.; New South Wales, Australia; donation by Oldfield Thomas.

Family **POTOROIDAE** Gray, 1821

Genus *Bettongia* Gray, 1837

BURROWING BETTONG *Bettongia lesueur* (Quoy & Gaimard, 1824) (NT)

MZUT T510 (702); mount; male ad.; Australia; I/1845; purchased by G.A. Frank

MZUT T511 (1131); mount; unsexed ad.; Australia; 1867; Pirocorvetta “Magenta” expedition.

WOYLIE *Bettongia penicillata* Gray, 1837 (CR)

MZUT T512 (790); mount; female ad.; Western Australia, Australia; 1845; purchased by G.A. Frank.

Genus *Potorous* Desmarest, 1804

LONG-NOSED POTOROO *Potorous tridactylus* (Kerr, 1792) (LC)

MZUT T513 (888); mount; male ad.; Tasmania, Australia; 1860; purchased by Verreaux.

Family **MACROPODIDAE** Gray, 1821

Genus *Lagorchestes* Gould, 1841

EASTERN HARE-WALLABY *Lagorchestes leporides*, Gould, 1841 (EX)

Fig. 5. MZUT T514 specimen of Eastern-Hare Wallaby *Lagorchestes leporides*.

MZUT T514; mount; unsexed ad.; Australia;

MZUT T515; mount; unsexed ad.; Australia;

MZUT T516; mount; unsexed ad.; Australia.

Remarks: The specimens MZUT T514-515 were undetermined. The specimen MZUT T516 was identified as *Bettongia rufescens*.

Genus *Lagostrophus* Thomas, 1887

BANDED HARE-WALLABY *Lagostrophus fasciatus* (Peron & Leseur, 1807) (VU)

MZUT T517 (797); mount; female ad.; Western Australia, Australia; 1845; purchased by G.A. Frank.

Genus *Onychogalea* Gray, 1841

BRIDLED NAILTAIL WALLABY *Onychogalea fraenata* (Gould, 1841) (VU)

MZUT T518; mount; male ad.; Australia;

MZUT T519; mount; unsexed ad.; w.d.

CRESCENT NAILTAIL WALLABY *Onychogalea lunata* (Gould, 1841) (EX)

MZUT T520 (796); mount; unsexed ad.; Western Australia, Australia; 1845; purchased by G.A. Frank.



Fig. 6. MZUT T520 specimen of Crescent Nail Wallaby *Onychogalea lunata*.

Genus *Thylogale* Gray, 1837

TASMANIAN PADEMELON *Thylogale billardierii* (Desmarest, 1822) (LC)

MZUT T521; mount; unsexed ad.; Tasmania, Australia.

RED-NECKED PADEMELON *Thylogale thetis* (Lesson, 1828) (LC)

MZUT T522 (792); mount; female ad.; New South Wales, Australia; 1845; purchased by G.A. Frank; MZUT T523; skin; unsexed; Gosford, New South Wales, Australia; 1893; donation by G. Podenzana.

Genus *Petrogale* Gray, 1837

BRUSH-TAILED ROCK-WALLABY *Petrogale penicillata* (Gray, 1827) (VU)

MZUT T524 (1373); mount; unsexed ad.; Australia; 1893; purchased by Mr. Schiavetti.

Remarks: The specimen MZUT T524 was undetermined.

Genus *Setonix* Lesson, 1842

QUOKKA *Setonix brachyurus* (Quoy e Gaimard, 1830) (VU)

MZUT T525; mount; unsexed ad.; Australia.

Remarks: The specimen MZUT T525 was undetermined.

Genus *Wallabia* Trouessart, 1905

SWAMP WALLABY *Wallabia bicolor* Lesson, 1828 (LC)

MZUT T526 (798); mount; male ad.; Western Australia, Australia; 1845; purchased by G.A. Frank.

Remarks: The locality of provenance is out of the range of the species (Wilson & Mittermeier 2015).

Genus *Macropus* Shaw, 1790

EASTERN GRAY KANGAROO *Macropus giganteus* Shaw, 1790 (LC)

MZUT T527; mount; female ad.; Australia;

MZUT T528 (1084); mount; female ad.; Australia; no date; dead in captivity at the Royal Zoological garden of Torino;

MZUT T529; mount; male ad.; Australia; no date;

MZUT T530; mount; female juv.; w.d.;

MZUT T531 (MACUT 332); skeleton; w.d.

WESTERN GRAY KANGAROO *Macropus fuliginosus* **Desmarest, 1817(LC)**

MZUT T532; mount; female ad.; Australia; no date;
 MZUT T533 (361); mount; female ad.; Australia; no date; dead in captivity at the Royal menagerie of Stupinigi in II/1859;
 MZUT T534 (2234); mount; male ad.; Australia; no date;
 MZUT T534 (MACUT 7056); skull.

Genus *Osphranter* Gould, 1842

RED KANGAROO *Osphranter rufus* **Desmarest, 1822 (LC)**

MZUT T535 (1434); mount; female ad.; Australia; no date;
 MZUT T536; mount; female ad.; w.d.;
 MZUT T537; mount; female ad.; w.d.

Remarks: All specimens were undetermined.

Genus *Notamacropus* Dawson & Flannery, 1985

RED-NECKED WALLABY *Notamacropus rufogriseus* **Desmarest, 1817 (LC)**

MZUT T538 (2724); mount; male ad.; Australia; no date; donation by Enrico Festa. Dead in captivity;
 MZUT T538 (MACUT 7295); skeleton;
 MZUT T539 (789); mount; female ad.; King Island, Australia; 1845; purchased by G.A. Frank;
 MZUT T540 (804); mount; female ad.; Australia; V/1845; purchased by G.A. Frank;
 MZUT T541; mount; male ad.; w.d.;
 MZUT T542; mount; male ad.; w.d.;
 MZUT T542 (MACUT 3461); skull; w.d.;
 MZUT T543 (MACUT 336); skeleton; w.d.

Remarks: The specimen MZUT T542 was undetermined.

TAMMAR WALLABY *Notamacropus eugenii* **Desmarest, 1817 (LC)**

MZUT T544 (794); mount; male ad.; Western Australia, Australia; 1845; purchased by G.A. Frank;
 MZUT T545 (701); mount; female ad.; Australia; 1845; purchased by G.A. Frank.

Remarks: The specimen MZUT T544 was labelled as *Halmaturus hautmanni*.

PARMA WALLABY *Notamacropus parma* **Waterhouse, 1846 (NT)**

MZUT T546 (806); mount; unsexed ad.; Western Australia, Australia; V/1845, purchased by G.A. Frank.

Remarks: The locality of provenance is out of range of the species (Wilson & Mittermeier 2015).

UNDETERMINED SPECIMENS

Ailurops cf. *furvus*

MZUT T547 (703); mount; unsexed; Celebes Island, Indonesia; I/1845; purchased by G.A. Frank.

Remarks: The specimen could be identified as *A. furvus*, due to the size and coat coloration, but because of the size we can rule out an immature specimen of *A. ursinus*.

Isoodon cf. *auratus*.

MZUT T548; ethanol; w.d.

Remarks: The coloration seems to be that of *I. auratus*. However, the small size of the specimen could suggest an immature or an individual from a population of *I. obesulus* characterized by a small size.

Perameles sp.

MZUT T549; ethanol; w.d.

Remarks: The specimen could be a juvenile and therefore the identification is difficult. The coat coloration rules out *P. gunni*.

Petaurus cf. *australis*

MZUT T550 (359); mount; unsexed; Australia; 1819; purchased in London during the Bullock's Auction in 1819.

Remarks: The patagium is poorly developed, the coat coloration and the lack of the dorsal stripe seem to indicate *P. australis*.

Bettongia sp.

MZUT T551 (787); mount; male ad.; Australia; 1846; purchased by G.A. Frank

Thylogale cf. *thetis*

MZUT T552 (795); mount; male ad.; New South Wales, Australia; 1845; purchased by G.A. Frank.

Remarks: The correct identification is uncertain due to the faded coat, but red on neck and back suggest *T. thetis*.

Petrogale sp.

MZUT T553 (1367); mount; unsexed ad.; purchased by Mr. Schiavetti; 1893;

MZUT T554 (MACUT 3453); skull; no locality; 1896; purchased by Mr. Crivelli.

Remarks: We didn't find any information about Mr. Schiavetti and Mr. Crivelli.

Macropus sp.

MZUT T555; mount; male ad.; w.d.;

MZUT T556; mount; female ad.; w.d.;

MZUT T557; mount; male juv.; w.d.;

MZUT T558; mount; male juv.; w.d.;

MZUT T559; mount; female; w.d.;

MZUT T560; mount; female; w.d.;

MZUT T561 (MACUT 329); skeleton (no skull); w.d.;

MZUT T562 (MACUT 322); skull; juv.; w.d.;

MZUT T563; skeleton; juv.; w.d.

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