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Back to the future: forgotten historical museum specimens mark the presence of the swamp cat, *Felis chaus* Güldenstaedt, 1776 in Eritrea

ABSTRACT

The presence of the swamp cat, *Felis chaus*, is reported for the first time for the fauna of Eritrea on the basis of a specimen housed in Museo Regionale di Scienze Naturali in Turin. This species was never reported for Eritrea, and its diffusion along the Nile Valley beside Egypt's borders is little known. It is likely more extended than usually reported as supported by another specimen housed in Turin, and coming from "Nubia". So far, a new Palearctic species is added to the list of mammals of the Horn of Africa. These findings stress the need to maintain and study natural history collections that represent the basis of our understanding of life on Earth.

Keywords: Eritrea, *Felis chaus*, Horn of Africa, Palearctic species, swamp cat.

INTRODUCTION

Political instability and a series of civil unrest and wars precluded and obstructed the zoological knowledge of the Horn of Africa, including information on the mammal species occurring in this area. Eritrea, a former Italian colony between 1890 and 1941, due to its inclusion to Ethiopia and the subsequent independence wars, has received scarce zoological attention during the last 80 years, but for some information of a few species of mammals (see Zinner *et al.*, 2000; Hagos *et al.*, 2003; Chiozzi *et al.*, 2014). A possibility to ameliorate this aspect was provided by the analysis of historical collections, too often scanty studied (Gippoliti *et al.*, 2014). As a consequence, a recognition of historical data and field surveys of the country are equally urgent to assure an efficient biodiversity strategy (Gippoliti, 2020).

In this paper we provide new information about a little-known felid species, the swamp cat *Felis chaus* Güldenstaedt, 1776. Its distribution, as presently understood, ranges from the Nile Valley of Egypt to the Near East, Caucasus and east to India, Sri Lanka and mainland South-East Asia (Glass, 2013). Being mostly an Asian species, its diffusion in Africa has so far received little attention. De Winton (1898), who described the subspecies *F. chaus niloticus* from Egypt, considered the distribution of the swamp cat in Africa

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limited to Egypt. Later, Anderson (1902) and Setzer (1956) too did not listed the species from Sudan and the same did Glas (2013).

For all these reasons the presence of some overlooked old records of *F. chaus* from extra-Egyptian origin preserved in the mammal collections of Museo Civico di Zoologia in Rome and Museo Zoologico della Università di Torino (MZUT), presently housed at the Museo Regionale di Scienze Naturali of Torino, deserve a special attention.

MATERIAL AND METHODS

Museological researches carried out on several zoological Italian collections by one of the authors (SG) led to the discovery of a few African specimens of *Felis chaus* with an extra-Egyptian origin.

Notably, in the Museo Civico di Zoologia in Rome a mount specimen of *F. chaus* from “Abyssinia” (the old name for North Ethiopia - Eritrea) has been recorded under the number 232 in the old catalogue (Fig. 1). Two other specimens are preserved in Museo di Zoologia dell’Università di Torino (now housed in Museo Regionale di Scienze Naturali) collection as a flat skin with skull (General Catalogue, C.G. T2768) from Saganeiti (Eritrea) (Figs. 2-3) and two mount skins (C.G. T860 and C.G. T313), respectively from “Nubia” (Fig. 4) and from “Africa”. Due to the generic provenance, the specimen C.G. T313 is not further discussed.

For a correct identification of the species we compared the morphological characters and some biometric measures such as: body, ear and tail length, with those described in the Handbook of the Mammals of the World (Wilson & Mittermeier, 2015) and with those reported by the IUCN/SSC Cat Specialist Group (<http://www.catsg.org/index.php?id=114>). Measurements of the skull and skin variables were taken with a standard caliper, and compared them with those reported by Anderson & De Winton (1902), Pocock (1951), Dayan *et al.* (1990).

The measured variables were as follows: distance from the tip of the nose to anus (HBL); tail length (TL); height of ears (EarH); maximum length of skull from tip of rostrum to the nuchal crest (TLS); distance from posterior projections of the occipitals condyles to the anterior edge of premaxillary bones (CBL); maximum width of zygomatic arches (ZAW); interorbital width (IOW); postorbital constriction width (POW); palatal length (PL); maximum width of rostrum at canines (RWC); maximum rostral width at PM3 (MRW); maximum length of the tooth row (C-M1); upper canine diameter (CsupD), and upper carnassial length (P4L); maximum length of lower molar (m1L); distance from anterior tip of mandibular symphysis to the posterior edge of mandibular condyle (ManL).

RESULTS

The specimen from Abyssinia housed in Rome was donated by Professor Giuseppe Antonelli and identified as *Felis chaus niloticus* by Lepri (1912) on the basis of morphological characters and the distribution provided by Trouessart (1904). Unfortunately, we were not able to find any further information on Antonelli’s figure and neither more detailed data on the origin of this specimen, so due to his imprecise history, could not be a firm evidence of the species presence in the Horn of Africa.

More interesting are the specimens from Turin, in particular the skin C.G. T2658 obtained in 1899 from “Saganeiti” (now Segheneity: N15°3’10”, E39°11’14”), a place at 2200 m a.s.l. described as a wooded plain (AA.VV., 1938), and collected by Roberto Gentile, a lieutenant-photographer in service at the Italian royal army, who stationed in Eritrea since 1890. These findings confirm the former presence of this species in Eritrea.

Another remarkable specimen hosted in Turin collection (C.G. T860) was received in 1854 from “Nubia”, an ancient region in northeastern Africa, extending along Nile River Valley approximately from south of Aswan in Southern Egypt, eastwards to the shores of the Red Sea, and southward to the confluence of Blue and White Nile (near Khartoum, in Sudan). In the museum’s old catalogue this specimen is reported as *Felis / chaus / lybicus* Olivier, 1804 and is said to have been purchased by Gustav Adolph Frank (1809-1880), a well-known natural history dealer based in Amsterdam. Although lacking a precise locality, this specimen is a further confirmation that *F. chaus* distribution extends well over the boundary of Egypt. Interestingly enough, all these vouchers match exactly the geographic range accorded to *Catolynx chaus nilotica* Brandt, 1832 by Trouessart (1904) as “Africa Sept.-Or., Aegyptus, Nubia, Abyssinia”.

Measurements of the stuffed specimens, skin and skull are provided in Tabs I-II. The measurements of the Segheneity skull (Tab. II) when compared with those published for *F. chaus niloticus* in Pocock (1951) and Osborn & Helmy (1980), show an overall smaller size for all variables taken into account, falling just below the lower limit for female. Furthermore, following the age classes based on dental morphology and the degree of ossification of the spheno-occipital suture proposed by Nascimento & Feijò (2017), the skull presents totally emerged permanent teeth and a cranial suture not completely fused, suggesting that the specimen could probably be a young adult.

Museum acronym	Collection	Catalogue number	HBL	TL	EarH
MZUT	Turin	T860	640	240	62
MZUT	Turin	T2658	670	260	64
MCZR	Rome	232	660	240	55

Tab. I. Biometric measurements (in mm) of the *Felis chaus* specimens T860 and T2658 housed in Museo Regionale Scienze Naturali of Torino (MZUT collection), and n. 232 housed in Museo Civico di Zoologia of Roma (MCZ collection); HBL = distance from the tip of the nose to anus; TL = tail length; EarH = height of ears.

DISCUSSION

The first evidence of *Felis chaus* in Eritrea here reported represents a small contribution to fulfil a checklist of the mammals historically known to occur in the country, an important tool to plan further surveys and a national biodiversity strategy. For historical and political reasons, a satisfactory list of Eritrean mammals is still lacking despite the generous attempt by Shosani (2004) and the early attempt by Parisi (1918).

An evaluation of Eritrean specimens stored in European naturalistic museums is in our opinion crucial to establish an historical baseline that may help to understand the true

extent of biodiversity decline in the last century (Gippoliti *et al.*, 2018; Papworth *et al.*, 2009).

Although somehow paradoxical, it also seems that the current faunistic knowledge of some species or even of regions are worst than those already acquired more than a century ago. In our case we suspect that a sort of “identity crisis” encountered by most European natural history museums - and of specimen-based research - at the beginning of the 20th Century played a crucial role in overlooking the importance of collections for scientific research, especially inside universities (Andreone *et al.*, 2014; Gippoliti & Groves, 2018; Andreone & Gippoliti, 2020).

	MZUT T2658	Pocock (1951)	Osborn & Helmy (1980)
TLS	100.5	100-133	-
CBL	92.7	92-120	98.2-123.9
ZAW	66.2	66-82	70-92.1
POW	32.2	34-39	31.5-38.6
IOW	16.4	16-23	-
PL	35.7	-	-
RWC	21.4	-	26.6-34
MRW	37.1	-	-
C-M1	31.3	-	34.9-41.9
CsupD	4.3	-	-
P4L	11.4	13.5-16	13.5-16.5
m1L	8.4	9-11.5	-
ManL	65.3	-	-

Tab. II. Biometric measurements of the skulls belonging to the specimen MZUT T2658 housed in Museo Regionale Scienze Naturali of Torino, compared with data provided by Pocock (1951) and Osborn & Helmy (1980).

From a biogeographical perspective, the presence of *Felis chaus* in Eritrea represents a further zoological element of Palearctic origin reaching the Horn of Africa. This was already discussed by Yalden *et al* (1996) who noted a number of endemic taxa of mammals; *Capra walie*, *Lepus starcki*, and *Canis simensis* that are descendants of Palearctic stock. More recently other endemic taxa have been added as *Plecotus balensis* (Kruskop & Lavrenchenko, 2000), while among non-endemics, *Capra nubiana* should be remembered (de Beaux, 1934). Another Palearctic species was signaled for Eritrea based on old zoo importations, the red fox *Vulpes vulpes aegyptiaca* Sonnini (Gippoliti, 2020), but confirmation is required.

CONCLUSIONS

The findings of *Felis chaus* reported in this paper highlight the importance of the collections housed in Italian natural history museums. This is particularly true for historical specimens, which were collected in localities and periods that so far had received scarce attention. The example is extraordinarily relevant, especially because it refers to a species that belong to the felid family, one of the best known among mammals.

What turns out to be evident is that mammological collections are among the most interesting ones, and that only in part they have been revised in recent years. In Italian natural history museums recent catalogues – i.e. monotremes and marsupials, primates and rodents (Calvini *et al.*, 2016; Amori & Doria, 2018; Doria *et al.*, 2021; Ghiraldi *et al.*, 2021) showed a very rich repertoire. So far, the fact that in Italy there are only a few museum curators with specific competences in mammals, and even less interested in extra-Italian faunae, obstructed from highlighting little-known taxa.

Finally, we believe that it will be crucial that in the next years a greater effort is done to boost a revision and online databasing of most of the mammalogical collections hosted in the major Italian museums (i.e. Turin, Genoa, Milan, Florence, Rome, and Pisa) so that the results are put together in a sort of diffuse collection or metamuseum, more easily available to external researchers, as already proposed by Minelli (2013) and Andreone *et al.*, (2014).

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RIASSUNTO

Ritorno al futuro: specimen museali storici confermano la presenza di Felis chaus Gldenstaedt, 1776 in Eritrea

La presenza di una nuova specie di felide, *Felis chaus*, viene riportata per la prima volta per la fauna dell'Eritrea, sulla base di un esemplare conservato al Museo Regionale di Scienze Naturali di Torino. Questa specie non è mai stata segnalata per l'area, e la sua distribuzione lungo la Valle del Nilo al di fuori dei confini egiziani è poco conosciuta ed è probabilmente più estesa di quanto normalmente riportato, come evidenziato da un altro esemplare torinese proveniente dalla "Nubia". Una nuova specie paleartica pertanto si aggiunge all'elenco dei mammiferi del Corno d'Africa. Questo caso sottolinea una volta di più la necessità di mantenere e studiare le collezioni di storia naturale che costituiscono la base della nostra comprensione della vita sulla Terra.

Parole chiave: *Felis chaus*; gatto di palude; Corno d'Africa; Eritrea; specie paleartiche.

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REFERENCES

- AA.VV., 1938. Africa orientale italiana. - Consociazione Turistica Italiana, Milano.
- AMORI G., DORIA G., 2018. Catalogue of Sciuridae in the Museum of Natural History of Genova (Mammalia, Rodentia). - *Annali del Museo civico di Storia naturale "G. Doria"*, Genova, 111: 357-408.
- ANDERSON J., 1902. Mammals of Egypt. Revised and completed by W.E. de Winton. - Hugh Rees, London.
- ANDREONE F., BARTOLOZZI L., BOANO G., BOERO F., BOLOGNA M., BON M., BRESSI N., CAPULA M., CASALE A., CASIRAGHI M., CHIOZZI G., DELFINO M., DORIA G., DURANTE A., FERRARI M., GIPPOLITI S., LANZINGER M., LATELLA L., MAIO N., MARANGONI C., MAZZOTTI S., MINELLI A., MUSCIO G., NICOLOSI P., PIEVANI T., RAZZETTI E., SABELLA G., VALLE M., VOMERO V., ZILLI A., 2014 - Italian natural history museums on the verge of collapse? - *ZooKeys*, 456: 139–146.
- ANDREONE F., GIPPOLITI S., 2020. Le biblioteche della vita. - *Le Scienze*: 80-87.
- DE BEAUX O., 1934. Lo stambecco della Colonia Eritrea. - *Annali del Museo civico di Storia naturale "G. Doria"*, Genova, 56: 384-394.
- CALVINI M., SIORI M.S., GIPPOLITI S., PAVIA M., 2016. Catalogue of the primatological collection of the Torino University. Natural History Sciences. - *Atti Società italiana di Scienze naturali di Milano*, 3 (2): 3-26.
- CHIOZZI G., BARDELLI G., RICCI M., DE MARCHI G., CARDINI A., 2014. Just another Island dwarf? Phenotypic distinctiveness in the poorly known Soemmerring's gazelle, *Nanger soemmerringii* (Cetartiodactyla: Bovidae), of Dahlak Kebir Island. *Biological Journal of the Linnean Society*, 111: 603–620.
- DAYAN T., SIMBERLOFF D., TCHERNOV E., YOM-TOV Y. 1990. Feline canines: community-wide character displacement among the small cats of Israel. - *The American Naturalist*, 136 (1): 39-60.
- DE WINTON W.E., 1898. *Felis chaus* and its allies. - *Annals and Magazine of Natural History*, (7) 2: 291-294.
- DORIA G. AMORI G., LOMBARDI BOCCIA G., FLANNERY T., HELGEN K.M., 2021. Catalogue of Monotremata and Marsupiala in the Museum of Natural History of Genova (Mammalia). - *Annali del Museo civico di Storia naturale "G. Doria"*, Genova, 113: 347-399.
- GHIRALDI L., CARMIGNOTTO A.P., TOSETTO V., INGLEBY S., ELDRIDGE M.D.B., 2021. Revised catalogue of monotremes and marsupials in the historic mammal collection housed at Museo Regionale di Scienze Naturali of Torino, Italy. - *Bonn zoological Bulletin*, 70: 1-14.
- GIPPOLITI S., 2013. Luigi Fossati e le conoscenze mammalogiche eritree degli Italiani. - *Natura*, 103: 123–134.
- GIPPOLITI S., 2020. Records of Ethiopian and Eritrean mammals in Italian literature and museums, with some taxonomic notes. - *Biogeographia - The Journal of Integrative Biogeography*, 35: 27-42.
- GIPPOLITI S., AMORI G., CASTIGLIA R., COLANGELO P., CAPANNA E., 2014. The relevance of Italian museums for research and conservation: the case of mammals. - *Rendiconti Lincei Scienze Fisiche e Naturali*, 25: 351–357.

- GIPPOLITI S., GROVES C.P., 2018. Overlooked mammal diversity and conservation priorities in Italy: impacts of taxonomic neglect on a biodiversity hotspot in Europe. - *Zootaxa*, 4434: 511–528
- GIPPOLITI S., HAGOS F., ANGELICI F.M., 2018. Eritrean ungulates in Italian museums as benchmark for taxonomy and conservation planning. - *Hystrix Italian Journal of Mammalogy*, Supplement: 30.
- GLAS L., 2013. *Felis chaus* Swamp Cat (Jungle Cat). In Kingdon J, Hoffmann M (Eds.), *Mammals of Africa Volume V*, pp. 197-199. Bloomsbury, London.
- HAGOS Y., YACOB Y., GHEBREHIWET M., SHOSANI J., 2003. The elephants (*Loxodonta africana*) of Gash-Barka, Eritrea: Part 1. Historical perspective and related findings. - *Pachyderm*, 34: 13–23.
- KRUSKOP S.V., LAVRENCHENKO L.A., 2000. A new species of long-eared bat (*Plecotus*; Vespertilionidae, Mammalia) from Ethiopia. - *Myotis*, 38: 5–17.
- LEPRI G., 1912. Nota su alcuni *Felis* acquistati dal Museo Zoologico della R. Università di Roma. - *Bollettino Società Zoologica Italiana*, (3) 1: 3-19.
- NASCIMENT F.O. DO, FEJO' A., 2017. Taxonomic revision of the tigrina *Leopardus tigrinus* (Schreber, 1775) species group (Carnivora, Felidae). - *Papéis Avulsos De Zoologia*, 57 (19): 231-264.
- OSBORN D.J., HELMY I., 1980. The contemporary land mammals of Egypt (including Sinai). - *Fieldiana Zoology*, NS 5: 1-579.
- PAPWORTH S.K., RIST J., COAD L., MILNER-GULLAND E.J., 2009. Evidence for shifting baseline syndrome in conservation. - *Conservation Letters*, 2: 93-100.
- PARISI B., 1918. Catalogo dei mammiferi eritrei del Museo di Milano. - *Atti della Società italiana Scienze Naturali e del Museo Civico Storia Naturale Milano*, 56: 320-330.
- POCOCK R.I., 1951 *Catalogue of the genus Felis*. - Printed by Order of the Trustees of the British museum, London.
- SETZER H.W., 1956. *Mammals of the Anglo-Egyptian Sudan*. - *Proceedings U.S. National Museum*, 106: 447-587.
- SHOSANI Y., 2004. Paleozoogeography and neozoogeography of mammals in Eritrea. - *Bulletin of Carnegie Museum of Natural History*, 36: 267–276.
- TROUSSERT E.-L., 1904. *Catalogum Mammalium tam viventium quam fossilium*. - *Quinquennale Supplementum*. R. Friedländer, Berlin.
- YALDEN D. W., LARGEN M. J., KOCK D., HILLMAN J. C., 1996. *Catalogue of the mammals of Ethiopia and Eritrea. 7. Revised checklist, zoogeography and conservation*. - *Tropical Zoology*, 9: 73–164.
- ZINNER D., F. TORKLER F., PELAEZ F., 2000. Primates in Eritrea - Distribution and habitat. In: Rheinwald G. (ed.), *Isolated vertebrate communities in the tropics*, pp. 255-264. *Proceedings of the 4th Symposium in Bonn*. - *Bonn Zoological Monograph*, 46.



Fig. 1 – *Felis chaus*, stuffed specimen coming from “Abyssinia” (catalogue number MCZR 232), housed in Museo Civico di Zoologia (Rome), and.



Fig. 2. *Felis chaus*, skin of the specimen MZUT T2658 obtained in 1899 from “Saganeiti”, currently housed in the Museo Regionale di Scienze Naturali (Turin).



Fig. 3. *Felis chaus*, cranium of the specimen MZUT T2658, currently housed in the Museo Regionale di Scienze Naturali (Turin).



Fig. 4. *Felis chaus*, stuffed specimen MZUT T860, obtained in 1854 from “Nubia”, currently housed in the Museo Regionale di Scienze Naturali (Turin).