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Message from the Chair

Galen Rathbun

Chair, IUCN/SSC Afrotheria Specialist Group

Recently, the Zoological Society of London asked for nominations for their Breaking Point initiative, a list of the 100 species at imminent risk of extinction in the wild (see news item on page 9). Our specialist group nominated three afrotheres. The Critically Endangered Juliana's golden mole (*Neamblysomus julianae*), found only near Pretoria in South Africa, and the Vulnerable web-footed tenrec (*Limnogale mergulus*) from Madagascar were not selected, but the third afrotherian nomination was chosen as one of the 100, under quite unusual circumstances. The giant sengi (*Rhynchocyon* sp.) on Kenya's northern coast has not been assessed for the IUCN Red List because it has not even been described yet – thus it has

no official taxonomic status or name, even though its future is precarious. It was included on the list because it highlights the problem of unknown species being eliminated when their habitat is destroyed. On page 6 of this newsletter is an update on the status of the very small forest and its unique biodiversity, including the giant sengi, on Kenya's northern coast. This area is about to experience massive development, with an associated huge increase in the number of people living there and a likely adverse impact on local habitats. Of course all of this is related mostly to the ballooning global human population and its thirst for African oil.

It has been several years since most of our afrotheres were assessed for the IUCN Red List. Although the status of most of the 78-odd species that we oversee will not have changed, some have. For example, the monospecific sengi genus *Macroscelides* has been split into 2 species (see Dumbacher et al. in recent literature on page 12), and thus an update is warranted. It also is possible that the status of existing Red List taxa and their habitats have changes, thus requiring a reassessment. If you are aware of a specific need for a reassessment, please let me know so that we can begin the process.

When our group was formed over ten years ago, designing and choosing a group logo seemed to be low on our priority of activities – we had a newsletter to start, species to assess for the Red List, and a web site to assemble. Now that we have matured, we think it is time to revisit the need for a logo for our specialist group. We are therefore holding a competition to find a suitable design. So if you want to try your hand and get your creative juices flowing how about giving it a go (page 9).

And finally, the latest IUCN quadrennium (currently 2008-2012) has ended so our specialist group membership will be dissolved and then assembled for the next four years. This is a rather disruptive process, but on the other hand it allows our membership to evolve and include the most knowledgeable and active specialists working with our afrotheres.

G.B. Rathbun
Cambria, California. September 2012.

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Scientific Articles

Newcomers enrich the European zoo aardvark population

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Zoological institutions are important players in conservation, education, and research. Numerous zoos, for instance, have developed breeding programmes for species that are threatened or endangered, sometimes leading to their reintroduction in the wild (Frankham *et al.* 2002). Most of these institutions have also developed scientific facilities and collaborations for carrying out research on the ethology of animals that would be difficult to study in the wild. This is the case for the elusive aardvark, *Orycteropus afer*. Zoos have provided most of the available information on the reproduction of this species (e.g. Shoshani *et al.* 1988, Taylor 2005), and have been instrumental in the study of their life history requirements (Ganswindt *et al.* 2011). Currently, attention is also being focused on the analysis of the genetic and morphological intra-specific variability of aardvarks. In this respect, a survey of the zoo population of aardvarks, in collaboration with individual zoos and studbook keepers, is essential.

In this paper we give an overview of the small population of aardvarks kept in European zoos and provide some information on the new animals recently introduced from the wild, which will certainly benefit the entire zoo population for decades to come.

Aardvarks in Europe

Aardvarks have been kept in European zoological institutions since 1869, starting with London Zoo (Flower 1929), and followed during the next 50 years by a few other institutions. Many of these early captives were acquired by European zoos from colonies in western, southern and eastern Africa. However, these aardvarks were difficult to maintain and did not survive for very long, nor did they produce any offspring. As an example, two Ethiopian (Abyssinian) aardvarks arrived at the Frankfurt zoo in 1925 (Fig. 1) and died within the same year (Wegner, 1925).

A second wave of aardvarks arrived in Europe in the middle of the 20th century. According to the European Studbook (ESB) (Schoo 2009, 2010, 2011), these aardvarks had been wild-caught in southern Africa, probably mostly Namibia. In 1962, the Frankfurt Zoo became the first zoological institution in the world to report conception in a captive aardvark. Although the neonate only survived five days, it was soon followed by births in other zoos across Europe. Thanks to the

improvement of husbandry methods, including better diet and enclosures, and also a general increase in sharing information between zoological institutions, the European population of aardvarks started to take root, and even expand. This was accompanied by the establishment of the first European studbook (ESB) by the European Association of Zoos and Aquaria (EAZA).



Figure 1. Announcement of the first aardvarks held at the Frankfurt Zoo (Wegner 1925).

The expansion of the aardvark population in European zoos was certainly partly due to the fact that most aardvarks were kept in a group with at least a pair (♂ and ♀), despite their solitary habits in the wild (Melton, 1976). Although considerable effort was invested in aardvark breeding programmes, it still proved to be very difficult to keep the newborns alive. Very often, parents would inadvertently smother their young by rolling onto them during sleep, and clumsily inflict injuries while interacting. These observations led many zookeepers to separate the sire (along with the other individuals in the enclosure) from the female as soon as signs of pregnancy were noticed. Currently at Frankfurt Zoo, males are returned to the enclosure with the mother and offspring when it has started to feed on solid food (about four months of age). Because mothers can also inadvertently harm or sometimes neglect their young, several zoos remove neonates and hand-rear them. In the last decades, numerous zoos have reported regular births, but the survival rate of the newborns remains low. At Frankfurt Zoo, for instance, between 1984 and 2000, the female called "Miss Piggy" (ESB number 60) gave birth to eleven young (5.5.1, representing respectively the number of males, female and unknown sex individuals), but only three survived (1.2.0). Likewise, her daughter "Rosa" (ESB 69) had nine (4.3.2) offspring between 1998 and 2006, but only four (3.1.0) lived for more than a few weeks.

Besides this survivorship problem, which affects long term breeding programmes, analyses conducted by the ESB keepers revealed a growing concern for inbreeding (Schoo 2011). A first attempt to remedy this problem was the introduction of two male aardvarks from the American zoo population in 1997. Although "Quiggly" (ESB 127) and "Elvis" (ESB 128) became the main reproducing males of the late 1990s and 2000s in European zoos (Fig. 2), unfortunately they are half-brothers, so that aardvarks on both continents are now more or less related. Thus, several zoos started to search

for unrelated armadillos from Africa, and since 2008 a third wave of armadillos has been brought into the European population. To date, zoos in Budapest and Győr (Hungary), Yekaterinburg and Kazan (Russia), Madrid (Spain), Frankfurt (Germany), Tbilisi (Georgia), and Wrocław (Poland) acquired new armadillos. Contrary to their predecessors, these animals were imported from Tanzania, and the armadillo population in European zoos is currently 51 (Table 1).



© Frankfurt Zoo

Figure 2. The male armadillo "Elvis" (ESB 128) from Frankfurt Zoo.

A compatibility issue

The armadillo is the last surviving species of the order Tubulidentata. It is only found in Africa, and it is thought to be represented by no less than 18 sub-species, up to four in Tanzania alone (Lehmann, 2006). However, the

validity of many is doubtful because most of the morphological characters used for their distinction are variable (c.f. Shoshani *et al.* 1988, Lehmann 2007, 2009). Even experienced zookeepers cannot find major difference in appearance between the southern African and Tanzanian individuals. For instance, the length of their hair varies with environmental conditions, including stress from inappropriate husbandry, thus these two "populations" show overlap for that feature. Body size and weight are similarly not useful, even when used to distinguish males from females. At the Frankfurt Zoo, for instance, the female "Rosa" was larger than the male "Elvis" (60 kg and 47 kg, respectively), but the new Tanzanian animals were opposite; female "Ermine" (ESB 194) is smaller (49 kg) than male "Ernst" (ESB 195; 58 kg). The question of subspecies distinction is important because numerous authors (e.g. Frankham *et al.* 2002, Allendorf & Luikart 2006) encourage the mixing of purebred individuals of a specific taxon (e.g. sub-species) to preserve the genetic variability in the long term. Conversely, the mixing of animals belonging to different taxa could lead to gene dilution and even outbreeding depression (cf. Frankham *et al.* 2002). Generally, the European zoos that acquired Tanzanian armadillos did not possess any animals from southern African origin, with the exception of Frankfurt Zoo, which has physically separated southern African male "Elvis" from the newcomers. Although this complies with one recommended management regimes, in the long-term the Tanzanian armadillos are expected to reduce inbreeding in the European captive armadillo population.

Table 1. List of European zoological institutions housing armadillos (as of May 2012). Sources: European Studbook (Schoo 2011) and www.zootierliste.de (accessed on 25 May 2012). Note that the "southern African" origin means that these individuals are zoo descendants from wild-caught animals coming from this region and imported to Europe in the 1960s and 1970s. The number of individuals is given with respect to their gender and following the zoo nomenclature: number of "male.female.unknown sex" individuals.

Zoological Institutions	Country	Individuals (male.female.unknown)	Origin
Antwerp Zoo	Belgium	2.1.0	Southern Africa
Prague Zoo	Czech Republic	1.2.0	Southern Africa
Randers Regnskov	Denmark	1.1.0	Southern Africa
Tbilisi Zoo	Georgia	1.1.0	Tanzania
Berlin Zoo	Germany	3.1.0	Southern Africa
Frankfurt Zoo	Germany	2.2.0	Southern Africa (1.0.0) Tanzania (1.2.0)
Saarbrücken Zoo	Germany	1.1.0	Southern Africa
Budapest Zoo	Hungary	1.1.0	Tanzania
Győr Zoo	Hungary	1.1.0	Tanzania
Arnhem Burgers' Zoo	Netherlands	1.3.0	Southern Africa
Wrocław Zoo	Poland	2.0.0	Tanzania
Kazan Zoo	Russia	1.1.0	Tanzania
Yekaterinburg Zoo	Russia	0.0.3	Tanzania
Madrid Faunia	Spain	0.1.0	Tanzania
Valencia Bioparc	Spain	1.1.0	Southern Africa
Blackpool Zoo	United Kingdom	1.1.0	Southern Africa
Chester Zoo	United Kingdom	2.0.0	Southern Africa
Colchester Zoo	United Kingdom	2.2.0	Southern Africa
Kessingland Alive!	Africa United Kingdom	1.2.0	Southern Africa
London Zoo	United Kingdom	1.1.0	Southern Africa
Total European armadillos (51)		25.23.3	Southern Africa (18.16.0) Tanzania (7.7.3)

A new home: the example at Frankfurt Zoo

Most of the newcomers are kept as pairs to encourage breeding and this has proven fruitful. After only a couple of years the new Tanzanian aardvarks have reproduced three times, two young were produced at the Győr Zoo (♂ ESB 201 in 2010 and another, which died after two days, in 2011), and one at the Frankfurt Zoo (♀ "Lotte" in 2012). These successes are certainly due in great part to the improvement of our knowledge about aardvark husbandry, including upgrading their enclosures.

At the Frankfurt Zoo, from 1978 until 2010, aardvarks were kept in the nocturnal section of the "Grzimekhaus", with an area of about 70 m², where the light regime was reversed for the benefit of the public. Their enclosure was partially filled with sand, and included a litter den with heated walls and floor, as well as two non-heated burrows fitted with display windows for the public. During pregnancy, the breeding male was removed from the nocturnal section and kept in a diurnal enclosure, behind the scenes. In 2010 the aardvark enclosure was expanded to include an adjacent area, increasing the total area to over 100 m². The expanded area includes two compounds partially filled with sand, connected by a passageway that can be closed, allowing males to be easily separated from the pregnant females. A new litter den, as well as two more lairs, was built and the burrows were heated (between 26° and 31°C) and fitted with display windows. Every den and burrow is accessible to the zookeepers, thanks to a network of corridors situated behind the enclosures. Depending on the situation, the aardvarks can be housed with other compatible animals, such as springhares (*Pedetes capensis*), mohol bushbabies (*Galago moholi*) and white-faced scops-owls (*Ptilopsis leucotis*).

Success story for the Tanzanian aardvarks at Frankfurt Zoo

In 2010 Frankfurt Zoo acquired two Tanzanian aardvarks (♀ "Ermine", ESB 194, and ♂ "Ernst", ESB 195). They were acquired as farm-bred animals, but may have been born under semi-wild conditions because their acclimatisation to the new enclosure in Frankfurt was quick but they are less inclined to be touched than zoo-born animals. Because aardvarks do not have obvious sexual dimorphism, a frequent problem is sexing animals, which was the case with the female "Ermine" and the male "Ernst". The teats of Ermine were not very developed, and she reacted strangely during mating attempts by lying flat on the ground. By experience, a reliable method to determine the sex of a captive aardvark is to palpate the reproductive organs while the animal is asleep or relaxed on its back. Sometimes, applying a little pressure to the genital area causes the appearance of the penis. At Frankfurt Zoo, mating usually occurs in the open part of the enclosure and also sometimes in the burrow.

At the beginning of March 2012 the female "Ermine" showed swollen nipples, which is a reliable sign of pregnancy. The teats will not totally return to their pre-pregnancy state and this feature can be used to determine if a female aardvark has been pregnant in the past. The zookeepers separated the male "Ernst" in the second part of the enclosure, and 16 days later, on 30th March, the female "Lotte" was born in one of the burrows fitted with display windows (Fig. 3). This first pregnancy could not be detected until about 227 days

after mating occurred. The average gestation period for the species is 243 days (range = 235-258, n = 6; Taylor 2005). According to Goldman (1986): "young have been born in captivity in all months of the year, with peaks in February, March, and June". At Frankfurt Zoo, these peaks could not be confirmed based on the last two decades (20 births between 1984 and 2006).



Figure 3. Mother "Ermine" (ESB 194) with daughter "Lotte" at Frankfurt Zoo.

The zookeepers at Frankfurt zoo have learned how to increase survival of young over the years. For example, they perform a daily morning check-up when the young is weighed and attended to. An additional "midnight control visit" is also made, at least during the first month of life. This helps reduce incidents of offspring being buried under litter or separated from their mother. The daily weighing of "Lotte" showed that she was 1500 g at birth (normal range = 1300-1900 g, n = 7; Taylor 2005), and she gained 100-150 g per day for 30 days, and then she gained 200-250 g per day so that at 51 days postpartum she weighed 9200 g, with a head-to-tail length of about 95 cm. Young zoo aardvarks often have skin abrasions on their tail and heel. This most likely happens because they spend much of their time lying down, with their tail and heels touching the ground, whereas when walking, their tail and heels are well above the ground. Zookeepers administer skin ointment and apply a dressing (Fig. 4), and in the case of "Lotte" her heel abrasion healed in 11 days and needed no further treatment.



©Frankfurt Zoo

Figure 4. Young female aardvark Lotte during the morning check-up at Frankfurt Zoo. Note the dressing on its tail and feet.

Conclusions and considerations for the future

Within just four years of their arrival in Europe, the new Tanzanian aardvarks have managed to establish themselves and breed. This positive start is a good omen for their future in European zoos. Moreover, the newcomers represent an opportunity to solve the aardvark inbreeding problem. But before mixing Tanzanian and southern African aardvarks it is urgent to test the relationships between the two populations to avoid gene dilution and outbreeding depression, respectively.

Robovsky and colleagues at the University of South Bohemia in the Czech Republic are currently working on the genetics of the captive aardvarks, and depending on the results, mixing or isolation of the two captive populations will need to be assessed. However, there are a few additional considerations in further developing a sound captive breeding programme: Currently there are 16 adults and one new-born Tanzanian aardvark in European zoological institutions. It is unclear if this number is sufficient for a viable population, even with a highly successful reproductive rate in these new animals. Finally, the inbreeding problem faced by the original European aardvark population, of southern African origin, would still not be solved, and might even spread to the American population, without additional animals (and genetic variability) from Africa. Encouragingly, a dozen zoological institutions in Europe have shown interest in obtaining their first aardvarks (Schoo 2011), so that with sound, scientifically-based coordination of the acquisition and transfer of individuals, a long term solution to the inbreeding problem could be found.

Even though the aardvark is considered “Least Concern” by the IUCN Red List (Lindsey *et al.* 2008), Africa is developing quickly, and in the future even animals that are currently seemingly safe could become threatened. With a viable zoo-breeding programme re-introduction becomes a possible conservation option in the future. Moreover, studies performed on the zoo population can have repercussions on wild aardvarks. In particular, the question of sub-species validity could show a more complex biodiversity pattern in modern aardvarks than previously realized. The conservation status of *O. afer* would have to be refined accordingly.

Acknowledgements

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Review

Eponyms in the Afrotheria: Who were the people that had Afrotheria species named after them?

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Several species in the supercohort Afrotheria are named after people, but most mammalogists know little, if anything, about them. The data below were assembled from the book *The Eponym Dictionary of Mammals* by Beolens, Watkins, & Grayson and published in 2009 by Johns Hopkins Press. Link Olson and PJ Stephenson also contributed information. The taxonomy is from www.afrotheria.net accessed November 2010.

If you can fill any gaps or know of an eponym in the Afrotheria that we've missed, please let me know.

Taxon	Common Name	Person species is named after	Nationality	Vocation	Dates
<i>Eremitalpa granti</i>	Grant's golden mole	Capt. Claude H.B. Grant	British	Ornithologist	1878-1958
<i>Chrysofallex trevelyani</i>	Giant golden mole	Herbert Trevelyn	?	?	? - ?
<i>Chrysochloris visagiei</i>	Visagie's golden mole	I.H.J. Visagie	South African	Landowner	? - ?
<i>Chrysochloris stuhlmanni</i>	Stuhlmann's golden mole	Prof. Franz Stuhlmann	German	Zoologist	1863-1928
<i>Chrysochloris zyl</i>	Van Zyl's golden mole	Maj. Gideon van Zyl	South African	Landowner	1873-1956
<i>Carpitalpa arendsi</i>	Arends' golden mole	Nicholas P. Arends	British	Collector	? - ?
<i>Carpitalpa duthieae</i>	Duthie's golden mole	Dr. Augusta Duthie	South African	Botanist	1881-1963
<i>Carpitalpa sclateri</i>	Sclater's golden mole	William L. Sclater	British	Ornithologist	1863-1944
<i>Amblysomus marleyi</i>	Marley's golden mole	Harold W. Bell-Marley	South African	Naturalist	1872-1945
<i>Neamblysomus gunningi</i>	Gunning's golden mole	Dr. Jan W. B. Gunning	Dutch	Physician	1860-1913
<i>Neamblysomus julianae</i>	Juliana's golden mole	Juliana Meester	South African	Spouse	1919-1986
<i>Micropotamogale lamottei</i>	Nimba otter shrew	Dr. Maxime Lamotte	French	Zoologist	1920-2007
<i>Echinops telfairi</i>	Lesser hedgehog tenrec	Dr. Charles Telfair	British	Collector	1778-1833
<i>Microgale cowani</i>	Cowan's shrew tenrec	Rev. William D. Cowan	British?	Missionary	1844-1923
<i>Microgale dobsoni</i>	Dobson's shrew tenrec	George E. Dobson	Irish	Zoologist	1848-1895
<i>Microgale drouhardi</i>	Drouhard's shrew tenrec	E. Drouhard	French	Forester	? - ?
<i>Microgale grandidieri</i>	Grandidier's shrew tenrec	Alfred Grandidier	French	Naturalist	1836-1921
<i>Microgale jenkinsae</i>	Jenkins' shrew tenrec	Paulina D. Jenkins	British	Mammalogist	?
<i>Microgale majori</i>	Major's long-tailed tenrec	Charles I. Forsyth Major	British	Paleontologist	1844-1923
<i>Microgale nasoloi</i>	Nasolo's shrew tenrec	Nasolo Rakotoarison	Malagasy	Mammalogist	1961-1996
<i>Microgale talazaci</i>	Talazac's shrew tenrec	Rev. Pere Talazac	French	Missionary	? - ?
<i>Microgale thomasi</i>	Thomas' shrew tenrec	M.R. Oldfield Thomas	British	Mammalogist	1858-1929
<i>Rhynchocyon cirnei</i>	Chequered sengi	Manuel J.M. Cirne	Portuguese	Governor	1784-1832
<i>Rhynchocyon petersi</i>	Black-and-rufous sengi	Dr. Wilhelm K.H. Peters	German	Naturalist	1815-1883
<i>Elephantulus edwardii</i>	Cape rock sengi	Jean B. Edouard Verreaux	French	Naturalist	1810-1868
<i>Elephantulus revouili</i>	Somali sengi	George E.J. Revouil	French	Naturalist	1852-1894
<i>Elephantulus rozeti</i>	North African sengi	Claude-Antoine Rozet	French	Army Officer	1798-1858
<i>Heterohyrax brucei</i>	Yellow-spotted hyrax	James Bruce	British	Explorer	1730-1794

Afrotheria News

An update on the threats to Afrotheria in northern coastal Kenya

As reported in the last edition of *Afrotherian Conservation* (Amin *et al.* 2011), the wooded areas in northern coastal Kenya are coming under threat from unsustainable forest exploitation and clearance for agriculture. These forests are a haven for several afrotheres, including aardvark and three species of sengi, while dugongs are found in the coastal waters (Andanje *et al.* 2010, 2011); they are also home to the indigenous Aweer people (also known as the Boni), whose culture and lives as hunter-gatherers have been forged from their long and intimate association with the forest.

In July 2011 we undertook a participatory rural assessment with the Aweer in Mangai, one of the six Aweer settlements (see Fig 1.), to understand more about the interdependence of the people and the ecosystem (Bett *et al.* 2011). Today perhaps less than 1,500 Aweer people live in the forest and none in the Boni or Dodori national reserves. They depend primarily on crop farming although they have had no formal support in their efforts to become cultivators and most have limited means and little access to agricultural extension and other services or markets. There is also considerable crop damage done by wildlife, especially by buffalos and baboons and increasingly by hippos, whose numbers are reported to be on the increase. All attempts to secure compensation from the authorities for the damage associated with human wildlife conflict have failed. The majority of people remain food-insecure most years. Coping strategies to address the deficit include falling back on traditional hunting and gathering skills, with women and older girls foraging for fruits, tubers, herbs and berries from the forest, and men collecting honey.

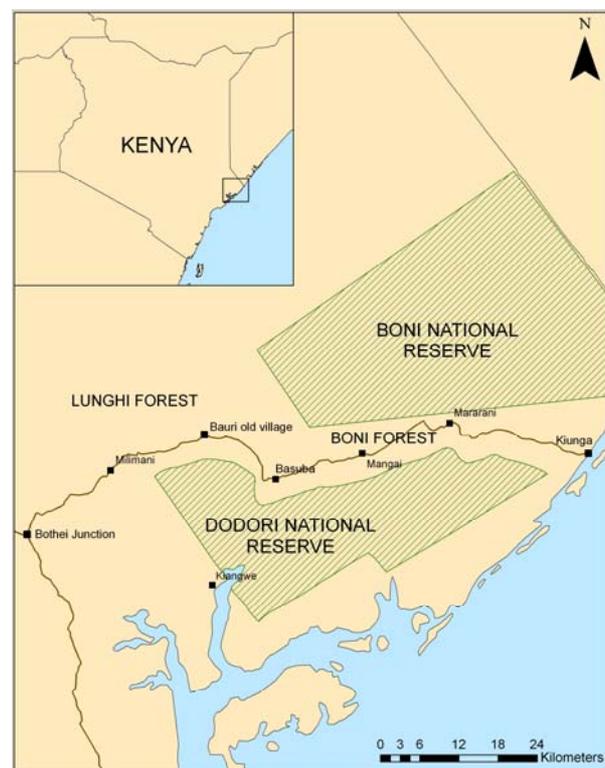


Figure 1. Map of north-eastern Kenya, showing national reserves and Aweer settlements.

Faced with few alternatives, the Aweer communities have continued to open up new farmlands within the forest corridor between the Boni and Dodori national reserves. The Constitution of Kenya 2010 calls for devolution of decision-making to county level, so now there is an excellent opportunity for community-based forest and related resources management with the Aweer and Ijara communities to be promoted by the county governments and the relevant government agencies (i.e. Kenya Forest Service, Kenya Wildlife Service, National Environment

Management Authority) in the forest corridor and the adjacent Boni and Lungu Forests. The Constitution and changes in thinking with respect to forest management also present an opportunity for the Boni and Dodori national reserves, which presently receive protection from the Kenya Wildlife Service (KWS), to be jointly managed with the communities. A number of non-governmental agencies working in the area are also committed to enhancing and strengthening community-based and joint forest management regimes (e.g. Kibodo Trust, SECURE project, WWF), so are well placed to offer the communities, councils and line ministries the support needed to improve forest conservation.

Given these existing opportunities and associated goodwill, the most pressing threats to the integrity of the forest ecosystems in northern coastal Kenya - and the afrotheres within - does not come from the forest communities whose roots are in the forest, but from the accelerating land-grabs, land conversion, and felling of indigenous hardwoods associated with, and driven by, the new Lamu port development. Excess resource exploitation prompted by this development now represent the greatest threat to the future of these forests.

Three African heads of state (Kenyan president Mwai Kibaki, South Sudanese president Salva Kiir Mayardit and Ethiopia's prime minister the late Meles Zenawi) hosted a ground-breaking ceremony in Lamu on 3rd March 2012 to launch officially the construction of the "super port," which will be the US\$5 billion flagship component of the Lamu Port South-Sudan-Ethiopia Economic and Transport Corridor project (LAPSSET). The port site lies fifteen kilometres outside Lamu's old town, which is a UNESCO World Heritage Site, and UNESCO has expressed strong concern regarding the project's potential impact (UNESCO 2012).

The port project comprises a superhighway, a high-speed railway, oil pipelines, a resort city, an international airport, and all associated services (e.g. water, sewerage). The Corridor's state-of-the-art infrastructure will mainly transport crude oil from South Sudan to China, which buys more than 60% of South Sudan's crude production. Kenya's Prime Minister Raila Odinga, who also attended the ceremony, proclaimed that LAPSSET would open markets in Asia, the Middle East, Europe and the Democratic Republic of the Congo: "It is literally the road toward the realisation of the African century and the African dream."

Uncontrolled activities associated with this large scale infrastructure development undoubtedly pose the main risk to the forests in northern coastal Kenya. Whilst we welcome economic development in this region we hope that sufficient measures will be put in place to limit and mitigate irreversible impacts on the critical coastal forest ecosystem and its rich biodiversity.

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Sengi research in the Free State, South Africa

In April 2012 we started a telemetry study on the eastern rock sengi (*Elephantulus myurus*) in the Free State, South Africa, to gather more information primarily on home range size and use, as well as on longevity.



Figure 1. Eastern rock sengi (*Elephantulus myurus*) in its natural habitat at Bethulie, Free State, South Africa.

The eastern rock sengi is a common species in eastern South Africa, eastern Botswana, western Mozambique and southern Zimbabwe on rocky outcrops in semi-arid savannas (Neal 1995) (Fig. 1). Seminal research on the species was mostly conducted on reproduction and physiology under laboratory conditions by Van der Horst and Gillman in the 1940s, and later by Tripp in the 1970s. Since then, several studies have been conducted of radio-tagged wild sengis in their natural habitat to study, for example, the impact of fire on habitat use by short-snouted sengis, *E. brachyrhynchus* (Yarnell *et al.* 2008), and the social structure of bushveld sengis, *E. intufi* (Rathbun & Rathbun 2006), and round-eared sengis, *Macroscelides proboscideus* (Schubert *et al.* 2009).

The social organization of *E. myurus* in KwaZulu-Natal was studied from August through December 2000 (Ribble & Perrin 2005) on a rocky outcrop in a habitat of open acacia savannas with tall grasses. For our pilot telemetry study in the Free State we chose another habitat and a different season. The study area is located on a 1,500 ha farm, c. 20 km north of Bethulie, at 1,600 m above sea level (Fig. 2). The area is densely covered



Figure 2. The various habitat types of the studied eastern rock sengi population.

with sweet resin bushes (*Euryops multifidus*); it has relatively flat rocky grassland areas as well as very steep rocky slopes with large boulders. Compared to the KwaZulu-Natal study area, the seasonal changes in our study area are extreme, with mean min/max temperatures ranging between 5°C-20°C in July and 15°C-38°C in January.

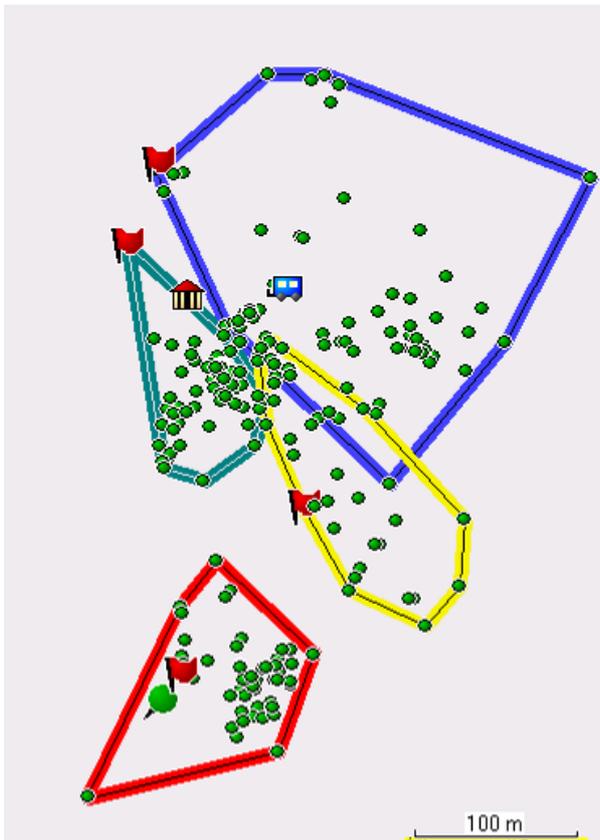


Figure 3. Home range polygons (100% minimum convex polygon) of four *E. myurus* between 4 -14 April 2012 (upper two males, lower two females; flags are capture points, points are radio telemetry locations).

In May 2011 the first sengis were marked with microchips during trapping by the National Museum in Bloemfontein. In April 2012 we used trap lines in the same area to radio collar four sengis. Unfortunately, during the study we lost three animals to predation, but the collars were retrieved and reused on three other animals, taking our initial sample size to seven. We also

marked 14 male and 13 female individuals with microchips to provide information on their survival. Two of the seven sengis marked in May 2011 were recaptured in April 2012. Longevity records from the wild reveal that sengis may survive only one winter but some sengi species live much longer in captivity (Olbricht 2007) - up to 9 years in the case of *E. intufi* (Weigl 2005).

Our first 2 weeks of preliminary data, with direct observations after finding the collared animals via telemetry, indicate that activity differs from the study in KwaZulu-Natal. Whilst in the earlier study the sengis' activity decreased from 23h00 – 5h00 hrs, with maximum activity between 18h00 – 23h00 hrs, we found the animals in Free State actively moving between 18h00-06h00 hrs. Home range size (see Fig. 3) during the 2 weeks in our study area was 0.66 – 3.96 ha in contrast to a mean monthly home range of males in KwaZulu-Natal of approximately 0.4 ha, with the largest home range size of 1.35 ha. In Bethulie, a strong difference was found between the male sengi that roamed in a more level area (3.96 ha) and the male living in the steep topography, infested by thick bushes (0.66 ha). The two females had home ranges of 1.06 and 1.15 ha, respectively.

This was a pilot study to test the methods and to see if we could start a long-term study with more animals. We are continuing to analyze the data and will publish our detailed results shortly. We hope this work will shed further light on sengi home ranges and activity patterns, and further demonstrate the value of telemetry in studying these afrotheres.

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The 100 most threatened species. Are they priceless or worthless?

Tarzan's chameleon, spoon-billed sandpiper and pygmy three-toed sloth have all topped a new list of the species closest to extinction released by the Zoological Society of London and IUCN. The recently discovered Boni giant sengi ensures the Afrotheria have a member on the list.

For the first time ever, more than 8,000 scientists from the IUCN Species Survival Commission have come together to identify 100 of the most threatened animals, plants and fungi on the planet. But conservationists fear they'll be allowed to die out because none of these species provide humans with obvious benefits....

Find out more, and read the book online, at:

<http://www.iucn.org/?11022/The-100-most-threatened-species--Are-they-priceless-or-worthless>

Surprise discovery about rock hyrax vocals

The rock hyrax is a surprisingly sophisticated communicator, a study published in a Royal Society journal suggests.

The small mammal is extremely vocal: males sing complex songs that can last for several minutes. But now scientists have discovered that the order of the notes is significant, suggesting that the songs have syntax. They also found that hyraxes from different regions had a different dialect when they warbled.

This research places the hyrax in a small and eclectic group of skilled animal communicators, including primates, whales, birds and bats.

Read more at: <http://www.bbc.co.uk/news/science-environment-17729868>.

IUCN SSC Chairs' Meeting 2012

Thanks to the generous sponsorship of the Environment Agency - Abu Dhabi (EAD), and the support of the Mohamed bin Zayed Species Conservation Fund, the second IUCN SSC Chairs' Meeting took place on 23–27 February 2012, at the Yas Island Rotana, Abu Dhabi. PJ Stephenson represented Galen Rathbun, the Afrotheria Specialist Group chair, at the meeting.



©PJ Stephenson
Delegates at the SSC meeting observing the local fauna.

The main outcome of the meeting was a work plan for the SSC for the next IUCN quadrennium (2013 – 2016), with the objective of advancing global species conservation efforts to create a positive impact and achieve the SSC vision: "A world that values and conserves present levels of biodiversity."

The meeting provided an open platform for all Specialist Group, stand-alone Red List Authority and Task Force Chairs in the SSC and the IUCN Global Species Programme to meet, share their experiences, and discuss ways forward on key conservation issues. In addition, discussions were held relating to existing and future collaborations with other IUCN Commissions, Programmes and international conventions.

Presentations from the meeting are available on the IUCN website at:

http://www.iucn.org/about/work/programmes/species/who_we_are/about_the_species_survival_commission/ssc_members_area/iucn_ssc_chairs_meeting_2012/

Noticeboard

Follow us on Twitter!

The Afrotheria Specialist Group is getting in to social media! In the 2010s it is increasingly important for all organizations to share information quickly and regularly and to seek feedback. To that end, we've set up a twitter account for the specialist group called The Tweeting Tenrec. As it says on the site, *Tenrecs and their relatives are the coolest mammals alive! Follow my tweets to learn about their biology and conservation and all the latest research news.*

The site is for all afrotheres so please let me have any news or latest publications as and when you want the word put out by The Tweeting Tenrec. Send an email to pjstephenson@wwfint.org, and please make sure the subject line includes the word "Tweet".

Come and find us, follow us and communicate with us on Twitter [@Tweeting_Tenrec](https://twitter.com/Tweeting_Tenrec).

Afrotheria SG logo competition

Our specialist group is one of the few in the Species Survival Commission without a logo. In the past we have tended to use the image on our web site home page – an outline of Africa and our name. However, perhaps we can do better considering all the innovative and eye-catching logos from other specialist groups (see IUCN SSC logos at <http://afrotheria.net/newsletter.html>).

I suggest that we assemble some logo designs for our specialist group, and then vote on which best represents our group. Keep in mind that a good logo is simple, distinctive, and represents our group. We probably should avoid colour and also abbreviations or acronyms (i.e. ASG might refer to the amphibian or antelope specialist groups).

Please email me your idea for a logo at grathbun@calacademy.org. Jonathan Kingdon (who was a member of our group last quadrennium) has also agreed to suggest a design for our consideration.

The deadline for submissions is 15 December 2012, and I will distribute the designs and a ballot to members by email soon after.

We're looking forward to seeing your ideas!

Galen Rathbun

Chair, IUCN/SSC Afrotheria Specialist Group

iSpot: a chance for South Africans to share nature

The South African National Biodiversity Institute (SANBI) has recently released a fantastic new website called iSpot which is taking citizen science in southern Africa to a whole new level. iSpot enables anyone to share with others anything they have discovered in nature by uploading geo-referenced photographs of their observations (whether plants or animals or fungi) onto an easy to use database somewhat like a virtual museum. iSpot, however, is infinitely more than just a collection of characterless data: it is a dynamic meeting place where nature enthusiasts, from beginners to experts, share their knowledge and help each other identify species. In this way, iSpot is user driven and is a fun and lively way to progress from a novice in identification to a learned expert.



Since its release in March 2011, iSpot has gained over 1,400 registered users, who have submitted over 25,000 observations to date, of which most (95%) have received an identification (given or confirmed by experts and other users on iSpot). Interactive mapping and searching tools, forums, direct links to the *Encyclopedia of Life* (<http://eol.org/>), plus a dictionary of all the scientific names for animals and plants make iSpot an indispensable reference for the inquiring naturalist. Wildlife societies can register on iSpot so that each time a member posts on the site, the society badge is displayed and links back to the society webpage. iSpot can also be used as a tool to run your own survey. Users from around the country can help collect data by tagging their observations with their own unique project tag. The same applies if you want to compile an inventory of species on your farm or at your local park; iSpot acts as the perfect tool to showcase this biodiversity.

iSpot regards all submissions as valuable for science, whether alien, indigenous, common or obscure. This approach has brought to our attention numerous species range extensions and some interesting discoveries. A strange looking parasitic plant found at Cape Point and uploaded by a regular iSpotter, Marland

Holderness, was identified as the presumed extinct *Cytinus capensis*, not seen for over 40 years!



The ideal way to get a feel for iSpot and how it works is to simply sign up and upload an observation of your own. Most of us have hundreds of photographs stored in files on our computers, unused and forgotten. Now is the chance to make a difference by contributing your little bit to help further our understanding and conservation of the rich biodiversity in South Africa. Who knows, you might even make a headline discovery. Visit iSpot southern Africa at www.ispot.org.za and get Spotting!



Sarah-Leigh Hutchinson

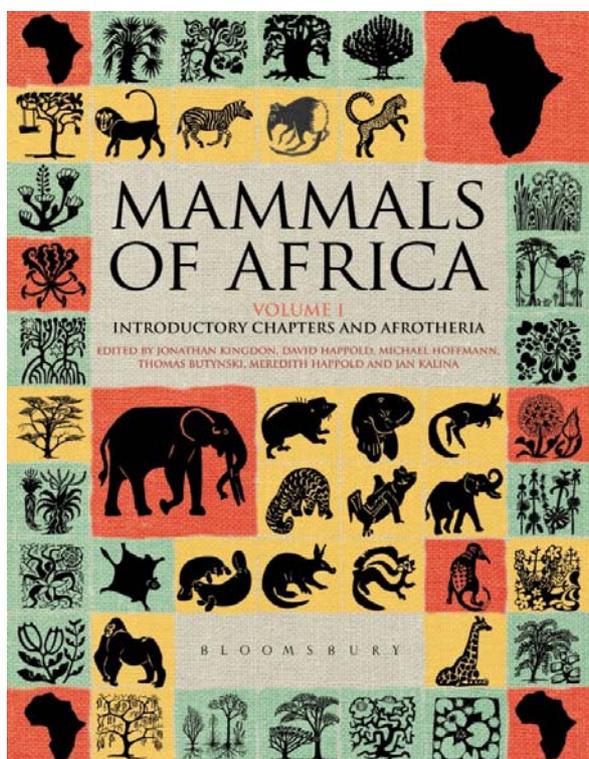
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A new publication on African mammals

A major new multi-volume reference work on African mammals is in press.

Nearly 15 years in production, *Mammals of Africa* is a series of six volumes that describes, in detail, every currently recognized species of African land mammal. This is the first time that such extensive coverage has been attempted, and the volumes incorporate the very latest information and detailed discussion of the morphology, distribution, biology and evolution (including reference to fossil and molecular data) of Africa's mammals. With more than 1,160 species and 16-18 orders, Africa has a tremendous diversity and abundance of mammals. The reasons for this and the mechanisms behind their evolution are given special attention in the series. Each volume follows the same format, with detailed profiles of every species and higher taxa. The series includes some 660 colour illustrations by

Jonathan Kingdon and his many drawings highlight details of morphology and behaviour of the species concerned. Diagrams, schematic details and line drawings of skulls and jaws are by Jonathan Kingdon and Meredith Happold. Every species also includes a detailed distribution map. Extensive references alert readers to more detailed information.



Of special interest to readers of *Afrotheria Conservation* will be Volume 1, which includes the afrotheres, and involves the contributions of no fewer than 15 members of the Afrotheria Specialist Group. The series editors are Jonathan Kingdon, David Happold, Thomas Butynski, Michael Hoffmann, Meredith Happold and Jan Kalina.

Volumes 1-6 will be published by Bloomsbury in February-March 2013.

Funding opportunities

The following calls for proposals may be of interest to those working on the Afrotheria and their colleagues. Deadlines for the next round of applications are provided, as are the websites for additional information.

Preservation of endangered species (8 February 2013)

The Trust has awarded grants to scientific researchers and conservationists for many years for work that is aimed at the preservation of endangered species, either through research or practical field work. They only accept grant requests from applicants already working and established in either the UK, UK overseas territories or any country NOT classified by the World Bank as high-income. The worldwide small grants programme offers a number of small grants for short-term conservation and research projects. The programme offers grants between £2,000 and £8,000 for projects of up to two years duration. Most grants will not exceed £5,000. These competitive grants are from a limited central fund and are awarded yearly. It is hoped that

these grants will enable innovative work and discreet projects to be carried out.

<http://www.ptes.org/index.php?cat=69>

British Ecological Society - Research Grants and Outreach Grants (4 March 2013)

The BES makes Research Grants in support of scientific ecological research where there are limited alternative sources of funding. Small projects can be awarded up to £5,000, and early-career ecologists can apply for funding up to £20,000. There are no restrictions on nationality or residence of applicants, or where they carry out their research work. Additionally, BES offers Outreach Grants of up to £2,000 to encourage its members and others to promote ecological science to a wide audience. The application deadlines are 17 September 2012 and 4 March 2013 for both types of grants

<http://www.britishecologicalsociety.org/grants/research/index.php>

<http://www.britishecologicalsociety.org/grants/outreach/index.php>

U.S. Fish and Wildlife Service

US Fish & Wildlife Service has a range of international grants for a range of species groups, including: Marine Turtle Conservation Fund (October 1 and April 1), African Elephant Conservation Fund (November 1 and April 1), Rhinoceros and Tiger Conservation Fund (November 1 and April 1), Great Ape Conservation Fund (November 1 and April 1), Wildlife Without Borders – Africa Program (December 1), Critically Endangered Animals Fund (April 1), Amphibians in Decline Fund (May 1).

<http://www.fws.gov/international/grants-and-reporting/how-to-apply.html>

Cleveland Metroparks Zoo - Africa Seed Grants and Asia Seed Grants. (5 November 2012)

Both programmes make grants for wildlife conservation and research in their respective regions. The priority is for projects focusing on wildlife and habitat protection, human-wildlife conflict, sustainable environmental practices, capacity building, and conservation biology. There are no application restrictions by nationality. In both programmes, the seed grants range from US\$1,000 to US\$3,500. The deadline for pre-proposals is 05 November 2012.

<http://www.clemetzoo.com/conservation/grants/>

Prince Albert II Foundation - Pre-Applications in 2012 (16 November 2012)

The Prince Albert II of Monaco Foundation makes grants for global environmental stability in themes of climate change, biodiversity, access to water, and the fight against desertification. Its geographical priorities are the Mediterranean Basin, the Polar Regions, and the Least-Developed Countries. The next round of pre-applications for grants will be 15 October 2012 through 16 November 2012.

http://www.fpa2.com/fondation.asp?page=deposez_vos_projets

Academy of Sciences for the Developing World (TWAS) – Grants for International Scientific Meetings in Developing Countries (1 December 2012)

TWAS makes grants in support of conferences, workshops, symposia, and special meetings in developing countries. Requests are submitted by the organizers of the meetings (i.e., not by individual participants). Grants are intended for air tickets, and do not normally exceed US\$5 thousand. Application deadlines are 01 June and 01 December each year.

<http://twas.ictp.it/prog/meetings/support-for-international-scientific-meetings>

French Global Environment Facility (FFEM) - Small Grants, Phase 3 (31 December 2012)

Phase 3 (2011-2013) of FFEM's Small-Scale Initiatives makes grants for biodiversity conservation in West and Central Africa, Madagascar, and Mozambique. Grants are a maximum of €50 thousand -- subject to co-financing requirements -- for NGO conservation organizations in eligible countries. For NGOs meeting the relevant criteria, pre-proposals can be submitted at any time before 31 December 2012.

<http://www.ffem.fr/cache/offence/lang/en/accueil/PP1;jsessionid=9A77C0FF280112D3D34931A997A99B75>

Phoenix Zoo - Grants for Conservation and Science (1 December 2012)

The Phoenix Zoo, Arizona, USA, makes small grants to support wildlife conservation and science worldwide. First-year grants are limited to US\$3 thousand. Priority is for practical projects that help build capacity, and that involve local communities. The application period is 01 November through 01 December each year.

<http://www.clemetzoo.com/apetag/Forms/phoenix-zoo-cons-grant-application.pdf>

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