

A POTENTIALLY NEW GIANT SENGI (ELEPHANT-SHREW) FROM THE UZUNGWA MOUNTAINS, TANZANIA

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ABSTRACT

Based on visual sightings and camera-trap photographs, an unusual form of giant sengi or elephant-shrew in the genus *Rhynchocyon* is identified from the Udzungwa Mountains of south-central Tanzania, which are already known for their extremely high biodiversity and endemism. This unique sengi appears to occur only in the Ndundulu, Mount Luhomero, and, possibly, Mwanihana forests and may therefore be of considerable conservation concern. A full description of this taxon, including formal naming, must await the collection and analysis of voucher specimens, which probably will take many months. In the meantime, it is important that conservationists focussing on the Eastern Arc Mountains be aware of the occurrence of this potentially new *Rhynchocyon* and field biologists participate in gathering additional information, especially on its distribution.

Keywords: Eastern Arc Mountains, elephant-shrew, *Rhynchocyon*, sengi, Udzungwa Mountains.

INTRODUCTION

The Eastern Arc Mountains of Tanzania and Kenya (figure 1) are among the most important areas on earth for the conservation of biodiversity (Lovett & Wasser, 1993; Myers *et al.*, 2000). Seventeen mammal species are endemic or near-endemic to the Eastern Arc Mountains, including the newly described highland mangabey *Lophocebus kipunji* Ehardt, Butynski, Jones, & Davenport, 2005 (Jones *et al.*, 2005), which has been recently elevated to the new genus *Rungwecebus* Davenport, Stanley, Sargis, De Luca, Mpunga, Machaga and Olson (Davenport *et al.*, 2006). The Udzungwa Mountains (10 000 km²), centred at 8°20'S, 35°50'E, represent the southernmost, largest, and most

biologically diverse block of the Eastern Arc chain of mountains (Burgess *et al.*, 1998; Dinesen *et al.*, 2001). This diversity is well reflected in the mammalian fauna, with over seventy species of medium to large mammals (F. Rovero & D. De Luca, unpubl.) and five endemic mammals, including a new soricid shrew in the genus *Congosorex* (Stanley *et al.*, 2005).

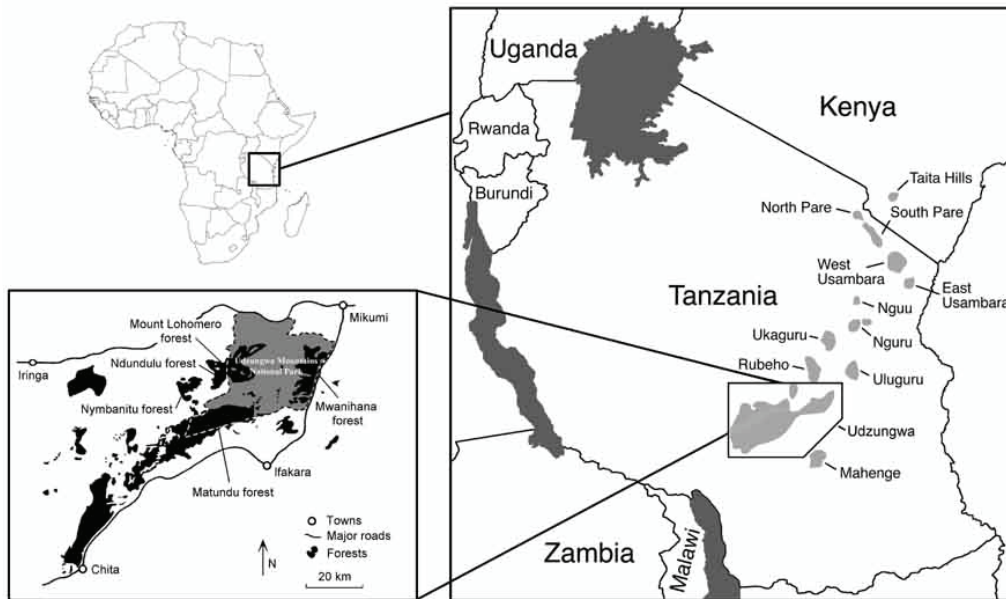


Figure 1. Map of the Eastern Arc Mountains and detailed map of the Udzungwa Mountains; the possible new *Rhynchocyon* has been camera-trapped in Ndundulu forest (map modified from Stanley *et al.*, 2005).

Sengis, or elephant-shrews, are restricted to Africa and form a well-defined order, the Macroscelidea. They are part of an early placental radiation of African mammals, the Afrotheria, which includes elephants, sea cows, hyraxes, the armadillo, golden moles, tenrecs and the sengis (Springer *et al.*, 1997). Giant sengis (genus *Rhynchocyon*) include three species that have been defined almost exclusively by their distinct pelage patterns and bright colouration (plate 1) and their disjunct distributions (Corbet & Hanks, 1968). The golden-rumped sengi *Rhynchocyon chrysopygus* Günther, 1881 and black-and-rufous sengi *R. petersi* Bocage, 1880 have very localised distributions in eastern Africa and the former is Endangered and the latter Vulnerable. The chequered sengi *R. cirnei* Peters, 1847 is more widely distributed and is Near Threatened (IUCN, 2006). Anthropogenic conservation issues (Rathbun, 1995), especially loss of forest habitat (Rathbun & Kyalo, 2000) and possibly hunting (FitzGibbon *et al.*, 1995), are the main causes of the threatened status of all three giant sengis.

The only *Rhynchocyon* species from the Udzungwa Mountains represented by specimens in museum collections is *R. cirnei* (Corbet & Hanks, 1968). In recent years, however, several sightings of animals with a black rump and reddish or russet body that vaguely resemble *R. petersi* have been reported to one of us (GR) from Ndundulu and Mount

Luhomero forests (L. Dinesen, T. Lehmberg, Q. Luke, A. Marshall, D. Moyer, M. Jones, T. Jones & F. Rovero, pers. comm.).(Q. Luke & T. Jones, pers. comm.) and two sightings were reported from Mwanihana forest (T. Butynski & Q. Luke, pers. comm.) (figure 1). These records prompted one of us (FR) to set up camera-traps in the Ndundulu Forest.

RESULTS AND DISCUSSION

We used three camera-traps during September and October 2005, and in 90 camera-trap days we obtained six photos of giant sengis from two camera-traps. Camera-trap days are computed as the total number of 24-h periods the cameras were operating, *i.e.* until they were retrieved or the film was full. The images were obtained on five different days between 6:29 and 17:23 h. All the sengis had the same general colour pattern, but at least three different individuals can be identified based on minor differences in colour patterns, especially on the tail. The camera-traps were within 1 km of 7°48'12"S and 36°30'14"E at an elevation of 1400–1450 m. The habitat in this area is pristine sub-montane moist forest.

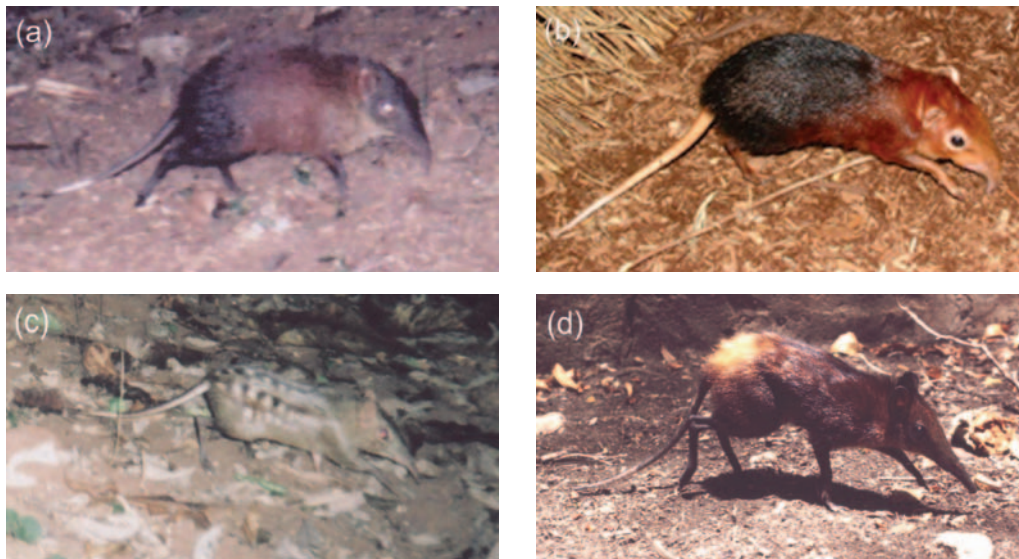


Plate 1. Photographs of giant sengis (*Rhynchocyon*): (a) potential new form, camera-trapped in Ndundulu Forest, Udzungwa Mountains, Tanzania, on 18 September 2005 at 8:22 h (photo by F. Rovero); (b) captive black-and-rufous sengi *R. petersi* (photo by K. McCafferty, Philadelphia Zoo); (c) chequered sengi *R. cirnei* camera-trapped by F. Rovero in Matundu forest, Udzungwa Mountains, about 22 km from the site of the possible new *Rhynchocyon*; (d) golden-rumped sengi *R. chrysopygus* from Kenya (photo by G. Rathbun).

Based on the camera-trap images, this sengi has body proportions similar to the currently recognised species of *Rhynchocyon* (Corbet & Hanks, 1968), but it is easily distinguished from all other forms by the combination of jet black rump and tail base, russet body, light chin and chest, and grey face (plate 1). It is superficially similar to *R. petersi*, but it does not have the diagnostic pink/orange tail, bright rufous-orange head, and black extending onto the back. The closest known population of *R. petersi* is from the Uluguru Mountains

(Swynnerton & Hayman, 1951), about 150 km to the north-east. The potentially new *Rhynchocyon* lacks the chequered pattern of *R. cirnei*, and the well-defined jet black rump is distinct from the dark subspecies *R. cirnei macrurus*, which has a blackish rump that extends onto the sides and up the back and includes indistinct chequers.

Based on limited data, the possibly new *Rhynchocyon* seems to be restricted to the Ndundulu, Luhomero, and, possibly, Mwanihana forests (about 300 km² of forest habitat). Chequered sengis have been sighted and camera-trapped (figure 1) from the disjunct Matundu and Nyumbanitu forests, which are about 15 km from the Ndundulu camera-trap site (FR & GR, unpubl.; T. Jones, pers. comm.). In Mwanihana Forest, should the single sighting of the possible new form be confirmed, then it appears that the two forms are separated by elevation, with sightings of the possibly new *Rhynchocyon* (ca. 1700 m) above those of *R. cirnei*. These data suggest that the giant sengis in the Udzungwa Mountains are not sympatric, although additional data are needed to better understand their spatial relationship.

We will not assign a name to the new *Rhynchocyon* until we have obtained and examined voucher material. Specimens, however, will be difficult to obtain because giant sengis are often difficult to capture (Rathbun, 1979), especially where they occur at low densities (Coster & Ribble, in press) or in heavily vegetated habitats. In the current situation, the difficulties are exacerbated by the remote location and the apparently very limited distribution of this sengi.

We are currently planning fieldwork to obtain voucher material that will allow us to assess and formally name this *Rhynchocyon*, as well as to better understand its distribution, abundance, conservation status, and phylogenetic relationship with the other giant sengis. Further observations by the numerous field biologists working in the Udzungwa Mountains should also help clarify the distribution of *Rhynchocyon* in the region. In the meantime, forest conservation in the Eastern Arc Mountains becomes of even greater importance with the discovery of this potentially new representative of one of Africa's more unusual, colourful and ancient groups of mammals.

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REFERENCES

- Burgess, N.D., J. Fjeldsá & R. Botterweg (1998). Faunal importance of the Eastern Arc Mountains of Kenya and Tanzania. *Journal of East African Natural History* **87**: 37–58.
- Coster, S. & D.O. Ribble (in press). Density and cover preferences of black-and-rufous elephant-shrews *Rhynchocyon petersi* in Chome Forest Reserve, Tanzania. *Belgian Journal of Zoology*.
- Corbet, G.B. & J. Hanks (1968). A revision of the elephant-shrews, Family Macroscelididae. *Bulletin of the British Museum (Natural History) Zoology* **16**: 47– 111.
- Davenport T.R.B., W.T. Stanley, E. Sargis, D.W. De Luca, N.E. Mpunga, S.J. Machaga & L. Olson (2006). A New Genus of African Monkey, *Rungwecebus*: Morphology, Ecology and Molecular Phylogenetics. *Science* **312**: 1378–1381.
- Dinesen, L., T. Lehmberg, M.C. Rahner & J. Fjeldsá (2001). Conservation priorities for the forests of the Udzungwa Mountains, Tanzania, based on primates, duikers and birds. *Biological Conservation* **99**: 223–236.
- FitzGibbon, C.D., H. Mogaka & J.H. Fanshawe (1995). Subsistence hunting in Arabuko-Sokoke Forest, Kenya, and its effects on mammal populations. *Conservation Biology* **9**: 1116– 1126.
- Jones, T., C.L. Ehardt, T.M. Butynski, T.R.B. Davenport, N.E. Mpunga, S.J. Machaga, & D.W. De Luca (2005). The highland mangabey *Lophocebus kipunji*: a new species of African monkey. *Science* **308**: 1161– 1164.
- IUCN (2004). *List of threatened animals*. www.redlist.org [accessed 15 July 2006].
- Lovett, J.C. & S.K. Wasser (1993). *Biogeography and Ecology of the Rain Forests of Eastern Africa*. Cambridge University Press, New York, USA.
- Myers, N., R.A. Mittermeier, C.G. Mittermeier, G.A.B. de Fonseca & J. Kent (2000). Biodiversity hotspots for conservation priorities. *Nature* **403**: 853– 858.
- Rathbun, G.B. (1979). The social structure and ecology of elephant-shrews. *Beihefte zur Zeitschrift für Tierpsychologie* **20**: 1–77.
- Rathbun, G.B. (1995). Conservation issues and strategies for elephant-shrews. *Mammal Review* **25**: 79–86.
- Rathbun, G.B. & S.N. Kyalo (2000). Golden-rumped elephant-shrew. In R. P. Reading & B. Miller (eds.), *Endangered Animals, a Reference Guide to Conflicting Issues*. Greenwood Press, Westport, Connecticut, USA. Pp. 125– 129, 340– 341.
- Springer, M.S., G.C. Cleven, O. Madsen, W.W. de Jong, V.G. Waddell, H.M. Amrine & M.J. Stanhope (1997). Endemic African mammals shake the phylogenetic tree. *Nature* **388**: 61–64.
- Stanley, W.T., M.A. Rogers & R. Hutterer (2005). A new species of *Congosorex* from the Eastern Arc Mountains, Tanzania, with significant biogeographical implications. *Journal of Zoology* **265**: 269– 280.
- Swynnerton, G.H. & R.W. Hayman (1951). A checklist of the land mammals of the Tanganyika Territory and the Zanzibar Protectorate. *Journal of the East African Natural History Society and National Museum* **20**: 274– 392.