

- Fischer, M.S. 1992. *Hyracoidea. Handbuch der Zoologie. Band VIII Mammalia*. Walter de Gruyter, Berlin & New York, Germany and USA.
- Gray, J.E. 1868. Revision of the species of *Hyrax*, founded on the specimens in the British Museum. *Annals and Magazine of Natural History, Series 4*, 1:35-51.
- Hahn, H. 1935. *Die Familie der Procaviidae*. Inaugural-Dissertation. Friedrich-Wilhelm-Universität zu Berlin. Druck von Reinhold Berger, Leipzig, Germany.
- Hatt, R.T. 1936. The hyraxes collected by the American Museum Congo Expedition. *Bulletin of the American Museum of Natural History*, 72: 117-141.
- Heim de Balsac, H. 1934. Note complémentaire sur les damans de l'Ahaggar. *Bulletin du Muséum National d'Histoire Naturelle*, 6 (2): 224-227.
- Heim de Balsac, H. and Bégouen, M. 1932. Faits nouveaux concernant les damans de l'Ahaggar. *Bulletin du Muséum National d'Histoire Naturelle*, 4 (2): 478-483.
- Kingdon, J. 1997. *The Kingdon Field Guide to African Mammals*. Academic Press, San Diego, USA.
- Kollmann, M. 1912. *Procavia* nouveau du Sahara algérien. *Bulletin du Muséum National d'Histoire Naturelle, Paris*, 5: 281-283.
- Kowalski, K. and Rzebik-Kowalska, B. 1991. *Mammals of Algeria*. Zakład Narodowy Imienia Ossolinskich Wydawnictwo Polskiej Akademii Nauk Wrocław, Poland.
- Olds, N. and Shoshani, J. 1982. *Procavia capensis*. *Mammalian Species*, 171: 1-7.
- Osborn, D.J. and Helmy, I. 1980. The contemporary land mammals of Egypt (including Sinai). *Fieldiana Zoology*, n.s. 5, XIX: 579 pp.
- Roche, J. 1972. Systématique du genre *Procavia* et des damans en général. *Mammalia*, 36: 22-49.
- Schmitter, D.A. 1993. Order Hyracoidea. Pp 373-4 in Wilson, D.E. and Reeder, D.M. (eds.), *Mammal Species of the World: A Taxonomic and Geographic Reference* (Second Edition). Smithsonian Institution Press, Washington, DC, USA.
- Schreber, J.C.D. 1792. *Die Säugethiere in Abbildungen nach der Natur, mit Beschreibungen*. Wolfgang Walter, Erlangen 4: 919-929.
- Schwarz, E. 1933. The hyrax of the central Sahara. *Annals and Magazine of Natural History*, 12 (10): 625-626.
- Shoshani, J. 2005. Order Hyracoidea. Pp. 87-9 in Wilson, D.E. and Reeder, D.M. (eds.), *Mammal Species of the World: A Taxonomic and Geographic Reference* (Third Edition). Johns Hopkins University Press, Baltimore, USA.
- Thomas, O. 1892. On the species of the Hyracoidea. *Proceedings of the Zoological Society of London*, 1892: 50-76.
- Wacher, T., De Smet, K., Belbachir, F., Belbachir-Bazi, A., Fellous, A., Belghoul, M. and Marker, L. 2005. *Sabelo-Sabaran Interest Group Wildlife Surveys. Central Ahaggar Mountains (March 2005)*. ZSL Conservation Report No. 4. The Zoological Society of London, London, UK.

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Article:

Tales of sengi tails

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In 2000, my wife Lynn and I were in Namibia researching the social organization of *Elephantulus intufi* (Rathbun and Rathbun 2006). During a meal at our study site which we shared with the landowner, his two sons and two archaeologists studying local rock art, the archaeologists showed us a newly published book (Lewis-Williams 2000). When Justin Holloway, the youngest son of the landowner, saw the cover photograph of a rock engraving he exclaimed “Hey look, an elephant-shrew”. When I saw the cover, it was obvious that Justin was right. I contacted Craig Foster, the photographer, who put me in touch with Janette Deacon, who was studying the site where the photograph was taken. Janette believed the engraving represented a composite of different animals, including the head of a shrew and the legs of an elephant. After several e-mail exchanges, we agreed that the engraving was a reasonably accurate depiction of an elephant-shrew or sengi. The site is well within the known distribution of a couple of species of *Elephantulus*, which I assumed were the models for the images. To our knowledge, this is the only known rock art of sengis.



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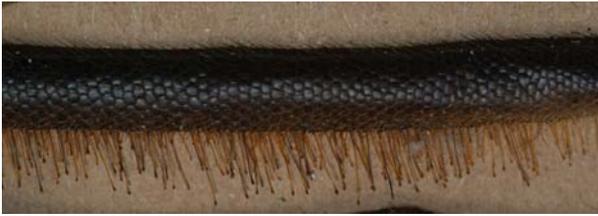
Figure 1: The four-toed sengi, *Petrodromus tetradactylus sultan*, from coastal Kenya (Photo G. Rathbun).

Conservation efforts rely on biologists with intimate knowledge of where species occur and the traits used in their identification. One of the important features used in distinguishing some forms of sengi are the characteristics of their tails. For example, Corbet and Hanks (1968) in their definitive revision of the Macroscelidea, used the colour of giant sengi (*Rhynchocyon*) tails to distinguish several forms. The tail skin of the black-and-rufous sengi (*R. petersi*) is rufous or orange, while the tail of the subspecies of the chequered sengi that is isolated in the Congo Basin (*R. cirnei stuhlmanni*) is white. All other forms of *Rhynchocyon* have tails that are shades of brown to black, with a variable terminal white band that is about 3 cm long.

Many of the 10 species of *Elephantulus* are difficult to distinguish, but some of the most cryptic forms can be identified by the ratio of the tail to head-and-body length (Corbet and Hanks 1968). For example, in southwestern

Africa, the tail of the western rock sengi (*E. rupestris*) is proportionally longer than that of the bushveld sengi (*E. intufi*).

Perhaps the most bizarre (and unique) tail feature used in the taxonomy of sengis is the presence or absence and structure of the bristles along the bottom of the tail on some subspecies of the four-toed sengi (*Petrodromus tetradactylus*; Fig. 1). In *P. t. tetradactylus* from Malawi, Zimbabwe, Zambia and Tanzania the bristles are well-developed with either simple or club-shaped tips (Fig. 2). The bristles on *P. t. sultan* from coastal Kenya are the most specialised, with knobs on the tips. The tails of *P. t. warreni* from coastal forests of northwestern South Africa, however, lack bristles altogether.



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Figure 2: Details of tail bristles (ca. 7 mm long) on *Petrodromus tetradactylus tetradactylus* from Tanzania, showing clubbed tips.

In August 2001, Janette, Craig, Lynn and I met at the engraving site on a private farm in the Northern Cape Province of South Africa. The area is part of the vast Karoo bushveld, but the site is unique because of numerous scattered black boulders (Fig. 3), many with engravings of humans, ostriches, elephants and various species of antelopes. Only a pair of boulders, however, included images of sengis. Janette showed me the two boulders and upon close examination of the extraordinary sengi images (Fig. 4) I was shocked: each of the five engravings included the unmistakable tails of *Petrodromus* (Fig. 5).



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Figure 3: Sengi engravings are on these large black boulders located in the Karoo bushland in Northern Cape Province, South Africa.

Speculation on the function of *Petrodromus* tail bristles has an interesting history, which is reviewed in Jennings and Rathbun (2001). The first hypothesis was that the clubs and knobs were the result of singeing from bush fires. Then Corbet and Neal (1965) suggested that the bristles were used to detect ground vibrations, presumably including those produced by conspecific foot drumming. In the early 1970s, colleagues speculated that the bristles

might be used as brushes to build and maintain the meticulous paths through the leaf litter that are characteristic of *Petrodromus*, but I suspected that the bristles were related to scent marking. I provided some preserved tail tissue to a Russian colleague, who documented that each bristle was associated with large sweat and sebaceous glands (Sokolov *et al.* 1980). The scent-marking hypothesis was further supported when I observed horizontal tail-lashing on the substrate associated with aggressive encounters between pairs of captive animals.



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Figure 4: Sengi engravings on boulders in the Karoo bushland.

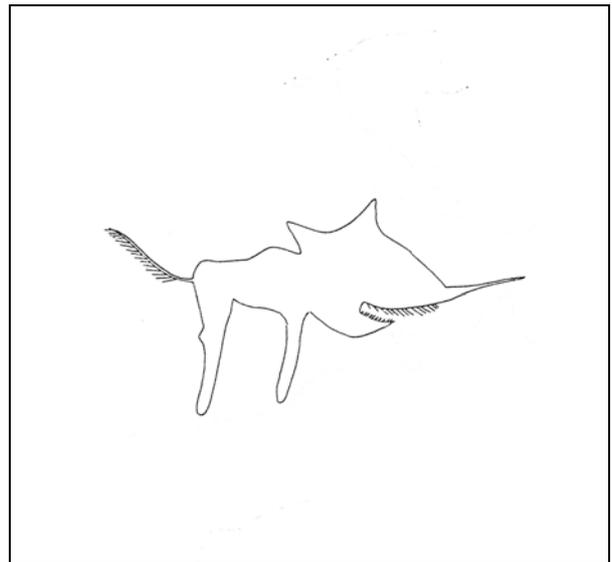


Figure 5: Paper tracing by Janette Deacon of one of the sengi engravings, showing tail bristles.

The sengi rock engravings raise several questions. Although *Petrodromus* was apparently well known to the unknown artist and must have enjoyed enough significance to be published (and thus preserved) in stone, why are the engravings of *Petrodromus* so far from “home”? There is no suitable habitat for *Petrodromus* anywhere nearby. Indeed, the closest population is about 1000 km to the east on the forested northern coast of KwaZulu-Natal, *but* the animals have no tail bristles there. The closest population with bristles is about 1200 km to the north in Zambia and Zimbabwe. Could the artist have travelled extensively in southern Africa, or do the engravings indicate that the distribution of *Petrodromus* has dramatically retracted since the engravings were made?

Perhaps more importantly, are the animals depicted really four-toed sengis? Janette (Deacon & Foster 2005) believes that the artist deliberately combined features of elephants (legs) and sengis (head and tail), along with adjacent engravings on one of the boulders of people dancing while carrying the tails of other animals. Like numerous images in the rock art of the San peoples of southern Africa, the sengi engravings may not depict reality. They are part of a religious art tradition, dating back 6000 years, that records the visions experienced by *!gi:ten* or medicine people when communicating with the spirit world.

So, are the engravings fanciful imaginations or reality, and if the latter might they have some biological or conservation significance? We may never know.

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References

- Corbet, G. B. and Hanks, J. 1968. A revision of the elephant-shrews, Family Macroscelididae. *Bulletin of the British Museum (Natural History) Zoology*, 16:47-111.
- Corbet, G. B. and Neal, B. R. 1965. The taxonomy of elephant-shrews of the genus *Petrodromus*, with particular reference to the East African coast. *Revue de Zoologie et de Botanique Africaines*, 71:49-78.
- Deacon, J. and Foster, C. 2005. *My Heart Stands in the Hill*. Struik, Cape Town, South Africa.
- Jennings, M. R. and Rathbun, G.B. 2001. *Petrodromus tetradactylus*. American Society of Mammalogists, *Mammalian Species*, 682:1-6.
- Lewis-Williams, J. D. 2000. *Stories that Float from Afar: ancestral folklore of the San of southern Africa*. Texas A & M University Press, Texas, USA.
- Rathbun, G. B. and Rathbun, C.D. 2006. Social structure of the bushveld sengi (*Elephantulus intufi*) in Namibia and the evolution of monogamy in the Macroscelidea. *Journal of Zoology* (London), 269:391-399.
- Sokolov, V. E., Dankova, A. A. and Eugen'eva, T. P. 1980. Morphology of the subcaudal specific cutaneous gland of the four-toed elephant shrew *Petrodromus tetradactylus*, Mammalia, Insectivora. *Doklady Akademii Nauk SSSR*, 250:746-748.

Afrotheria News

New study investigates the impacts of human activities on the density and distribution of sengis in Yoko Forest Reserve, DRC

Little is known of the Macroscelidea in the Democratic Republic of Congo (DRC). Four sengi species have been recorded in DRC yet their status and distribution are poorly understood. Forest managers know little of how much forest use impacts sengis and to what extent sengis are exploited by local people for subsistence hunting.

Building on my DEA studies (see *Abstracts*) I am conducting my doctoral research in Yoko Forest Reserve in Kisangani Region of northern DRC. For this research, four grids or quadrants of four hectares each were set up respectively in primary forest dominated by *Gilbertiodendron demevrei*, mixed primary forest, secondary forest and in old fallows. Traps were placed every 20m in the grids placed in the different habitats. The timing for the trapping is of 21 days per grid, per season and during a period of two years. Each site in the different habitats is being described. The evolution of the capture per site and per season will be analysed; the different human activities are also being noted and examined. A survey by questionnaire was submitted to the inhabitants of different local villages on the hunting of Macroscelidea. Expected results are: an understanding of the density, the distribution, and the dynamics of the Macroscelidea population and its habitat; an assessment of human impacts on sengis and their habitats.

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Afrotheria Noticeboard

Request for information on captive populations of streaked tenrecs

Few institutions have been successful in keeping the highland streaked tenrec (*Hemicentetes nigriceps*) in captivity. The reasons for the species failure to thrive are poorly understood.

Endangered Madagascar is a captive breeding facility for Malagasy wildlife in Bath, England. We currently keep four tenrec genera (*Setifer*, *Tenrec*, *Echinops* and *Hemicentetes*). According to ISIS, our breeding colony of *Hemicentetes nigriceps* is the only one in captivity.

We would like to hear from anyone with experience of keeping this species in captivity or fieldworkers who have pathology expertise.

Please contact:
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