Article:

Aspects of the biology of the Cape Sengi, *Elephantulus edwardii*, from the Western Escarpment, South Africa

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Introduction

The Cape Sengi *(Elephantulus edwardii)* is endemic to South Africa. It is associated with rocky terrain in both low and relatively high rainfall areas from extreme north-western South Africa in a belt that curves south to northern Western Cape, extreme southern Northern Cape and into western Eastern Cape. Through this fairly restricted range it is fairly common, yet there is little field data published on this sengi. Considerable information, however, exists based on laboratory studies, including thermal biology (Downs & Perrin 1995), parasites (Fourie *et al.* 1995), systematics (amongst others Raman *et al.* 1995; Raman & Perrin 1997), food consumption, assimilation and food passage (Woodall & Currie 1989) and activity patterns (Woodall *et al.* 1989). Skinner and Smithers (1990) summarise what little is known from wild caught specimens.

During the course of an extensive study of the rodent populations of South Africa's western escarpment during 29 months from January 1992 to January 1995, we also captured Cape Sengis. Because this species is poorly known, we present information on this species in this report.

Study Area

Our study was conducted on Sewefontein Farm (31° 35'45"S; 19° 07'48"E), situated near the village of Nieuwoudtville on the Bokkeveld Plateau of Western Cape Province, South Africa, about 400 km north of Cape Town.

The area consists of undulating to rugged hill country with steep-sided ridges separating a scattering of dryland cultivation (rooibos tea, lupins and oats) and natural vegetation in sand-bottomed valleys. Livestock, principally sheep, run freely over most of the area. The rock structures are dominated by Table Mountain sandstones and Malmesbury shales, which have many horizontal and to a lesser extent vertical crevices and narrow cracks between strata. The site is about 720 m above sea level. We recorded rainfall for six years that included the study period, and the annual average ranged from 200 mm to 500 mm. Much of the precipitation falls during the winter months, June to September. Because the study area is at the edge of the escarpment, it received slightly higher annual precipitation than areas to the east and west.

Three principal vegetation types merge in the area: arid karroid scrub from the east, succulent Karoo from the west, and Cape Heathland (Fynbos) from the south. The study area was dominated by low bushes and shrubs that were about 20-200 cm high and were particularly abundant on the valley bottoms and in gullies cutting through the ridges. Dominant plants included *Galenia procumbens, Osteospermum spinescens,* various *Protea* species, *Rhus burchellii* and several of the reed-like *Restio* species. Rock ledges used by the sengis were largely bare of vegetation.

Materials and Methods

We trapped Cape Sengis with breakback traps (18 cm x 10 cm) and Sherman-type live traps baited with a mix of peanut butter, oats, and a fat and meat extract. Traps were set haphazardly along rock ledges, rock crevices, and along the bottoms of steep gullies - especially where we found signs of rodent activity. We checked traps at dawn, midday, and dusk and rebaited when required. We recorded in the field head and body, tail, hind foot (SU), and ear lengths and body mass. We measured testes length and then preserved them in 10% formaldehyde, and we recorded the presence, location and size of foetuses before they were preserved. All testes and ovaries were deposited in the collections in the Department of Zoology and Entomology, Rhodes University, South Africa. We collected and preserved ectoparasites in 70% alcohol for later identification. A captive female Cape Sengi gave birth to twins, which we measured and weighed at intervals of one to three days.

Results

Morphology and Reproduction

Body measurements of captured sengis are presented in Table 1. Females were slightly larger than males (T-test P=0.022, Table 1). Maximum testes lengths were in August and September (Table 2), which is after the peak rainfall months. No measurements are available for November.

Table 1. Cape Sengi body measurements: a) male; b) female. Sample sizes are not the same for all measurements due to some specimens being damaged.

a). Males

Body measurement	Mean	N	Range
Head and body (mm)	107.8	56	93.8-120.0
Tail (mm)	134.4	56	117.0-148.0
Hind foot-su (mm)	32.9	56	31.1-34.7
Ear (mm)	29.7	57	24.7-34.0
Mass (g)	48.2	26	36.8-57.0

b). Females

Body measurement	Mean	N	Range
Head and body (mm)	110.9	40	96.7-124.5
Tail (mm)	139.3	40	123.0-160.0
Hind foot-su (mm)	33.5	43	31.3-35.5
Ear (mm)	30.1	43	27.5-35.7
Mass (g)	56.7	24	41.3-83.0

Table 2. Reproduction data: average testes length and number of pregnant females.

Month	Males (n=123)			Females (n=43)	
	Testes Length (mm)			No. pregnant	No. caught
	Mean	Range	N		
March	6.8	5.9-7.4	4	0	1
April	6.8	4.0-8.5	6	0	0
May	7.7	6.1-9.6	36	0	3
June	7.4	5.8-9.0	22	0	7
July	7.9	1.3-9.1	20	0	8
August	8.8	7.3-10.7	21	0	7
September	8.5	8.0-9.4	8	5	7
October	6.9	6.5-7.2	2	5	6
November	-	-	-	-	-
December	6.8	6.2-7.4	4	3	4

We found pregnant females from September to December. Of the 13 pregnant Cape Sengis we examined (Table 3), 12 were carrying two foetuses each. We first trapped immature sengis, which were less than about 90 mm head and body length, in November and continued to trap young through January.

Table 3. Foetal crown/rump lengths (mm) for each pregnant female captured (all were carrying twins except the one captured on 27 Sep 1994).

Date	Foetal length (mm)	
	left	right
09 Sep 1992	12.0	13.8
09 Sep 1993	3.6	3.5
09 Sep 1994	9.8	9.2
24 Sep 1994	42.2	35.1
27 Sep 1994	-	10.0
06 Oct 1994	30.8	33.0
10 Oct 1992	28.3	30.7
10 Oct 1992	7.7	7.7
12 Oct 1994	46.0	44.0
26 Oct 1994	25.1	26.7
12 Dec 1992	11.6	13.7
12 Dec 1992	38.5	33.9
20 Dec 1994	17.3	18.9

The captive female Cape Sengi gave birth between 0800 hr and 1100 hr on 11 December to two females (Table 4). The neonates were fully haired, eyes open, external pinnae erect, and toes separated. They were able to walk steadily by 1200 hr. Development rates of the two neonates are outlined in Figure 1 and compared with other data in Table 5. The widening discrepancy between the weights of the two young over time were due to competition that occurred between them at about day 18 at the single food dish. The smaller one died on day 43.

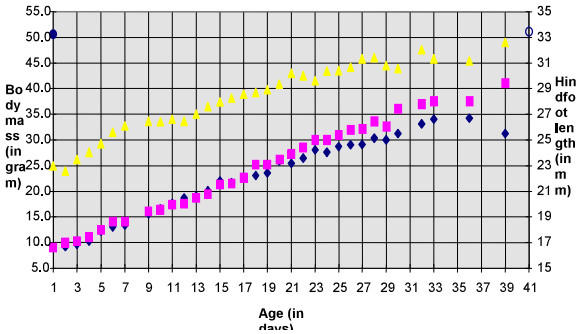
Table 4. Measurements of neonate twins born in captivity.

Measurement (unit)	Neonate 1	Neonate 2
Head and body (mm)	54.7	52.4
Tail (mm)	58.7	56.7
Hind foot (su)	22.9	23.1
Ear (mm)	11.9	13.7
Weight (g)	9	9

Table 5. Post-natal development of *Elephantulus edwardii*

Measurements	This study	Dempster *et al.* (1992)
Birth weight (g)	9	11.9
Birth hind foot (mm)	23	25.7
Birth weight in % adult weight	17.8%	23.6%
Litter weight in % adult weight	35.5%	42.5%
Hind foot as % adult hind foot	66.7%	74.3%
Weight growth rate (g/day)	0.89	0.59
Hind foot growth rate (mm/day)	0.28	0.3
Weight at 1 month as % adult weight	73%	65%
Hind foot at 1 month as % adult hind foot	95.8%	95%

Figure 1. Growth rates of two neonates. Squares represent mass for neonate 1 and diamonds for neonate 2. Triangles represent the average hind foot length for both neonates.



Ecology

We regularly saw sengis during daylight hours while servicing our traps, but during the hottest hours in the summer months they remained in the shade of crevices. At these times they frequently made rapid dashes into the open to snatch insect prey, or to move to adjacent crevices. The sengis were also active during the night and dawn based on observations while checking traps at these times.

Three species of rodents occupied the same rock crevices as the Cape Sengis, with the Rock hyrax *Procavia capensis* using and sharing the larger retreats. The Namaqua rock rat (*Aethomys namaquensis*) was particularly abundant throughout the study period, although populations of this rodent declined noticeably during the winter months. The Cape spiny mouse (*Acomys subspinosus*) was less common and frequently occupied narrower crevices than those used by the sengis. Present at very low densities was the Spectacled dormouse (*Graphiurus ocularis*). The dormouse is principally insectivorous, and the spiny mouse includes some invertebrates in its diet, therefore possibly resulting in nocturnal feeding competition with the sengis. However, cursory examination of stomach contents indicated that sengis were feeding mainly on ants whereas the two rodents rarely had the remains of these insects in their stomachs. Based on our observations, Cape Sengis seem to be

principally wait-dash-snatch hunters, operating from the edge of shaded crevices. The one exception observed was of sengis foraging on the communal dung middens of Rock hyraxes, where they flicked over dung pellets with their front feet, and to a lesser extent their snout, to expose ants, termites, flies, and beetles. Only three ectoparasites were identified from Cape Sengis, namely the louse *Polyplax biseriata*, and two ticks, *Ixodes* sp. and *Rhipicephalus cf. simus*.

Cape Sengi, *Elephantulus edwardii*
Photo: Chris & Tilde Stuart

Discussion

Our observations of diurnal as well as nocturnal activity of Cape Sengis contrast with Smithers & Skinner (1990), who suggest they are predominantly nocturnal. Smithers & Skinner (1990) also record that young Cape Sengis are born in the summer months from November to January. We found pregnant females in September, October and December, with juveniles from November to the end of January. We suspect that spring births predominate in the winter rainfall areas of its range, and somewhat later in areas in the east of its range receiving mainly summer rains. We base this on casual observations of young animals in February and March in the Eastern Cape Province.

The louse (*Polyplax biseriata)* we found on the sengis has not previously been mentioned as occurring on any macroscelid (Fourie, *et al.* 1995). This species is normally associated with the rodent genus *Tatera*, of which one species *T. afra* occurred on the sandy flats of the greater study area. Parasites were collected on a random basis from a limited number of animals.

Smithers & Skinner (1990) state that a single young, sometimes two, is the norm, but our data do not support this. Of the 13 pregnant females we examined, 12 were carrying two foetuses and only one had a single foetus. The captive female gave birth to twins.

Acknowledgements

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Article:

The conservation of golden moles (Afrosoricida; Chrysochloridae) with emphasis on the status of *Neamblysomus julianae* in South Africa

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The conservation status of the Juliana Golden Mole (*Neamblysomus julianae*) and its habitat is of considerable concern to the Afrotheria Specialist Group. During a scientific meeting held in Morogoro, Tanzania in July this year, several of our members participated in a workshop on the Afrotheria. During this meeting we discussed the deteriorating status of golden moles in general, and their habitats in some areas of South Africa.

Golden moles are morphologically very similar and it is possible that undescribed cryptic species are contained within the 21 species currently recognised in nine genera,