

Diversity of small mammals in owl pellet assemblages of Karonga district, northern Malawi

Christiane DENYS, Wilbert CHITAUKALI, John Kazeza MFUNE, Michaël COMBREXELLE, Franck CACCIANI

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Abstract. A small mammal taxonomical inventory has been realized in north Malawi in August 1996. Trapping sessions in three localities close to Karonga associated with collection of various predators assemblages yield new reports of *Steatomys*, *Beamys* and *Thallomys* presence for that region. The importance of predators as uncommon small mammals collectors is confirmed.

Key words: owl pellets, Malawi, small mammals diversity.

Christiane DENYS, Franck CACCIANI, Michaël COMBREXELLE, Laboratoire Mammifères & Oiseaux, Muséum National d'Histoire Naturelle, 55, rue Buffon, F-75005 Paris; Wilbert CHITAUKALI, National Museums of Malawi, Blantyre, Malawi; John K. MFUNE, Department of Biology, Chancellor College, P. O. Box 280, Zomba, Malawi & Department of Zoology, University of Aberdeen, Aberdeen, Scotland.

I. INTRODUCTION

Malawi is one of the many African countries which contain species of rodents of systematic interest. Malawi is of particular interest because it is situated geographically between the northern savanna region and the Zambezian Region, and because it has a very high diversity of rodents (56 species) (ANSELL and DOWSETT 1988) for its small surface area. Karonga (09°56' S, 33°56' E) is situated in the northern part of Malawi, on the western edge of the Western Rift Valley and close to Lake Malawi. It is surrounded by a mosaic of miombo woodland and farmland. Rivers which arise on the plateau country to the west of Karonga are associated with dense vegetation, and with swamps where they flow into the lake. The species richness of small mammals in a locality can be assessed by a variety of trapping techniques, and by examination of the remains of small mammals eaten by predators. Nocturnal and diurnal birds of prey (such as owls and eagles) and mammalian carnivores (such as canids and felids) may eat many small mammals, and can concentrate the remains of their prey in their pellets and scats. The taxonomic and biogeographic information provided by these sources of identifiable skeletal remains can be very important because these predators may frequently catch some mammals which are rarely captured by classical trapping methods (HAPPOLD and HAPPOLD 1986; BRUDERER 1996; DIETERLEN and RUPP 1978; DENYS et al. 1985, 1995).

In their annotated check list and atlas of Malawi mammals, ANSELL and DOWSETT (1988: 133) underline the importance of the Karonga locality, as a type locality for two sub-species of rodents *Cryptomys hottentotus whytei* THOMAS, 1897 and *Saccostomus campestris elegans* THOMAS, 1897. The Karonga region has not been sampled for its small mammals since that time. The importance of this region justified the collection of additional specimens, especially tissues and organs for further molecular analyses (BARÔME *et al.* submitted) as well as small mammals. In addition, owl pellets and predator scats have been collected near the village of Malema in the Karonga region and are analysed here in relation to the biogeographical ranges of the species.

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II. STUDY AREAS

Our study areas were at Malema, about 15 km South of Karonga (10°01' S, 33°55' E), at Mweni-rondo 500m North of Malema and at Ipyana, about 3 km South of Karonga (9°57' S, 33°56'). We arranged seven trapping sessions during August 1996, that is at the nearly end of the dry season. Each session lasted for three nights, using 15 BTS (Besançon Technique Service) and 16 Shermans traps. Each habitat was searched for owl pellets and predator scats. Details of each sample site are as follows: (1) Malema 1 was the banks of the Rwasho river where a cultivated sandy area ended by a degraded riverine forest on a slope. (2) Malema 2 was a banana plantation and the tall grasses surrounding the plantation. (3) Malema 3 [Malema Hill] was Miombo woodland with open clearings of dry grasses on gravel soils. (4) Malema 4 [Malema bush camp] was on either side of a road where there was a mosaic of low Miombo woodland (bush) dry grasses in the clearings on one side of the road, and a cassava garden and low bush on the other side. (5) Malema 5 [Malema camp] was between two cultivated fields under big mango trees. (6) Ipyana was a swampy habitat. Traps were set in two different habitats: – in a water-logged habitat vegetated by reeds; – and a bamboo thicket, and in a dry habitat with tall dry grass. These two habitats were separated about 200 meters by old rice fields. (7) Mweni-rondo was miombo woodland on a plateau where gullies cut into white and yellow silty sands allowed to place traps in dry stream beds. Provisional identifications and nomenclature in this paper follow ANSELL & DOWSETT (1988). The minimum number of individuals (MNI) in pellets and scats were calculated using the frequency of the long bones, right or left, found in the predator remains. The scats and pellets were dissected under water using a binocular microscope.

III. RESULTS AND DISCUSSION

Results are given in Table I and II. Trapping success was very varied. Mean success (excluding the dry grass habitat at Ipyana) was 10% (range 1-20%). In the dry grasses on the edge of Ipyana swamp, trapping success was 84% mainly because of the large numbers of *Mastomys cf. natalensis* (SMITH, 1834). The principal species trapped, as expected from ANSELL and DOWSETT (1988), were *Tatera leucogaster* (PETERS, 1852), *Saccostomus campestris* PETERS, 1846, and *Mastomys cf. natalensis*. Only two localities (Malema 1 and Malema 2) supported all three species; only one or two species were found at the other localities. Owl pellets and predator scats were found in Malema 1 (two samples), Malema 3, and Malema 4 (four samples) (Table III). One scat collection belonging to a rather large small mammal predator (*Canis* sp. or *Felis* sp.) was found close to one of the trap lines (sample F), and the other, perhaps from *Genetta* sp., was found among stones on a dry river bed (Sample E). At Malema 3, only one very small set of pellets, very degraded and of unknown

Table I

Trapping results at six localities near Karonga. See text for details of localities

Species	Localities							
	Malema 1	Malema	Malema 3	Malema 4	Malema 5	Ipyana		Mwenirondo
						Dry grass	swamp	
Trap nights	93	93	93	93	31	44	36	81
Trap success (%)	7.5	19.4	1.1	12.9	19.5	84.1	14	6
<i>Tatera leucogaster</i>	5	3		11	1	1		
<i>Saccostomus campestris</i>	1	1	1		5		5	
<i>Mastomys cf. natalensis</i>	1	14				35		
<i>Acomys spinosissimus</i>								3
<i>Aethomys chrysophilus</i>								2
<i>Crocidura sp.</i>						1		

Table II

Predator scats and pellets found near Karonga. Species of small mammals found in scats and pellets

Locality	Malema 1	Malema 1	Malema 3	Malema 4	Malema 4	Malema 4	Malema 4
Sample code	F	E	H	G1	G2	A	EL
<i>Tatera leucogaster</i>	7	1	2	11	2		1
<i>Saccostomus campestris</i>	10	1		5	5		3
<i>Mastomys cf. natalensis</i>	10	4	2	14	13	5	1
<i>Steatomys pratensis</i>	5	2		2		4	1
<i>Thallomys paedulus</i>	7			3			
<i>Beamys hindei</i>					1		
<i>Crocidura sp.</i>		1					

Table III

Predator scats and pellets found near Karonga. Details of scats and localities.
MNI = Minimum number of individuals based on the number of long bones

Sample code	Locality details	scats/pellets	Probable predator	Number of pellets/scats	M.N.I.
E	Stones in the bed close to the camp	scats	<i>Genetta</i>	3	5
F	Trap line near Rwasho river	scats	<i>Canis</i> or <i>Felis</i> sp.	10	15
H	Miombo woodland	pellets	unknown	1	6
A	Old man Camps: Kamonya "Malema"	pellets	? <i>Asio otus</i>	6	9
G1	Old man Camps: Kamonya "Malema"	scats	<i>Genetta</i>	31	4
G2	Old man Camps	scats	indet.	indet.	7
EL	Under electricity posts	pellets	diurnal raptor	13	6

origin, was found (sample H). The most numerous collections came from Malema 4; these were owl pellets of an unknown predator (perhaps *Asio otus*) (sample A), a big collection of scats from *Genetta* sp. (samples G1 and G2), and a collection of pellets from diurnal raptors found under electricity posts (sample EL). The scats and pellets contained more species than were found in any of the trap lines, ranging from two to five species (Table II). Species found in scats and pellets which were not caught by trapping were *Steatomys pratensis* PETERS, 1846, *Thallomys paedulus* (SUNDEVALL, 1846), *Beamys hindei* THOMAS, 1909. There were differences in the species richness and composition of the small mammals as indicated by the scats and pellets compared with trapping. At Malema 1, for example, scats contained two species which were not trapped (*Steatomys pratensis* and *Thallomys paedulus*), and scats suggested a higher proportion of two other species (*Saccostomus campestris* and *Mastomys natalensis*) than indicated by trapping.

This study confirmed the presence of a number of species which were expected to occur in the Karonga region (ANSELL and DOWSETT 1988). Of greater interest are those species which are rarely obtained and which have a disjunct distribution in Malawi and in neighbouring countries. For example, *Thallomys paedulus* is recorded from a number of localities in the southern half of Malawi (ANSELL and DOWSETT 1988) and in southern Tanzania (MUSSEY and CARLETON 1993) but was not previously recorded near Karonga. The known distribution of *Steatomys pratensis* is similar to that of *T. paedulus*, although ANSELL and DOWSETT (1988) present one record close to the Tanzanian border. The presence of both species in scats suggests that their distribution is more widespread than previously known. The rarity of two other species in this study should be commented: *Aethomys chrysophilus* (DE WINTON, 1897) is a widespread species in savanna woodlands of Malawi (ANSELL and DOWSETT 1988) and is trapped easily, yet it was rarely encountered. *Beamys hindei* is an uncommon though widespread species found in forested habitats, so the presence of remains of this species at Malema 4 is of particular interest. It is the first occurrence of *Beamys* in a predation assemblage, so this study confirms that predators are extremely good "collectors" of small mammals providing useful information about species richness and distribution. Such information complements data obtained by trapping methods.

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