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Checklist of mammals of the Udzungwa Mountains of Tanzania

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We present a checklist of mammals of the Udzungwa Mountains of south-central Tanzania (7°40′–8°40′ S and 35°10′–36°50′ E; Figure 1). The area (10,000 km²) contains the largest moist forest blocks of the Eastern Arc Mountains, a chain of ancient massifs partially covered in rainforest (Lovett and Wasser 1993), which is of outstanding importance for biodiversity conservation (Myers et al. 2000, Burgess et al. 2007). The area is also vulnerable to human exploitation because of the relatively small size of the forests, severe fragmentation (Brooks et al. 2002) and a lack of effective conservation management. The biodiversity importance of the Udzungwa Mountains is well reflected in the mammalian fauna (Kingdon and Howell 1993). There are five Udzungwa-endemic mammals in this area and 13 of the 17 mammals that are endemic to the Eastern Arc Mountains, Southern Highlands and Mount Kilimanjaro (Burgess et al. 2007). In particular, the Udzungwa Mountains hold two endemic and threatened monkeys (Rovero et al. 2006) and one near-endemic, recently discovered new genus and species of monkey (Jones et al. 2005, Davenport et al. 2006); therefore, it is regarded as one of the most important sites in Africa for primate conservation. The Udzungwa Mountains also exhibit outstanding carnivore diversity, with at least 26 species recorded (De Luca and Mpunga 2005a,b), including Jackson's mongoose *Bdeogale jacksoni*, newly recorded for Tanzania (De Luca and Rovero 2006), and Lowe's servaline genet *Genetta servalina lowei* (De Luca and Mpunga 2002). At least five species of forest antelopes co-exist, including the largest population of the Tanzanian-endemic and rare Abbott's duiker *Cephalophus spadix* (Rovero et al. 2005, Rovero et al. in press a). A new species of giant sengi or elephant-shrew of the genus *Rhynchocyon* has recently been discovered (Rovero et al. in press b).

Within the Udzungwa Mountains, the mammal records used in this inventory are from protected areas that cover an area of 4025 km². These protected areas are, from north-east to south-west (Figure 1): the Udzungwa Mountains National Park (UMNP, 1990 km²), the West Kilombero Scarp Forest Reserve (including Ndundulu and Nymbanitu Forests; 1042 km²), New Dabaga-Ulangambi Forest Reserve (33 km²), Nyanganje Forest Reserve (69 km²), Matundu Forest Reserve (106 km²), Iyondo Forest Reserve (280 km²), Uzungwa Scarp Forest Reserve (207 km²), and a number of isolated forest reserves in the south, near Mafinga town (298 km²). UMNP includes Mwanihana Forest to the east, a large portion of Matundu Forest to the south, which is partially a forest reserve, and Luhomero Forest to the west. Details on single forest blocks are found in Lovett and Pócs (1993) and Dinesen et al. (2001). The altitude range spans from approximately 300 m in the east to 2600 m a.s.l. for Mount Luhomero in the north-western portion of UMNP. The Udzungwa Mountains are extremely heterogeneous and contain several different habitat types, with closed-canopy forests interspersed with areas of dry woodland and grassland (Table 1). The climate is variable, with rainfall being as high as 2000–3000 mm per year on the eastern sides of moist forest blocks, and as low as 500 mm per year on drier slopes (UMNP unpublished data). Rainfall is almost exclusively concentrated in two periods: November–December and March–May.

We collected data over a period of 4 years (2002–2005) using a range of methods, especially camera-trapping, as well as line-transect censuses mainly for primates and forest antelopes, transects for sign and track counts, general survey walks, and village interviews (methodological details in Rovero and Marshall 2005, Rovero et al. 2005, De Luca and Mpunga 2005a,b). We deployed camera-traps at 75 sites, totalling over 3400 trap-days of sampling, in four areas: Mwanihana, Matundu and Mbatwa inside the UMNP, and Uzungwa Scarp to the south (Figure 1). We also summarised records and information from the literature and other researchers. Data on small mammals and bats are all from published sources.

We recorded a total of 118 species of mammals belonging to 30 families (Table 2). An additional 12 species are of probable occurrence (Table 2). Carnivores were the most represented order in terms of species richness (26 species confirmed and five probable), followed by rodents (25), bats (18), ungulates (16) and primates (12). Five taxa are strictly Udzungwa-endemic: the two primates Udzungwa red colobus *Procolobus gordonorum* and Sanje mangabey *Cercocebus galeritus sanjei*, the new giant sengi *Rhynchocyon udzungwensis*, the Phillips' Congo shrew *Congosorex phillipsorum*, and the mouse shrew *Myosorex kihaulei*. The 13 species that are Eastern Arc-endemic or near-endemic include the kipunji *Rungwecebus kipunji*, the mountain galago *Galagoides orinus* and Abbott's duiker *C. spadix* (see Burgess et al. 2007 for a full list). A total of 14 species are listed as

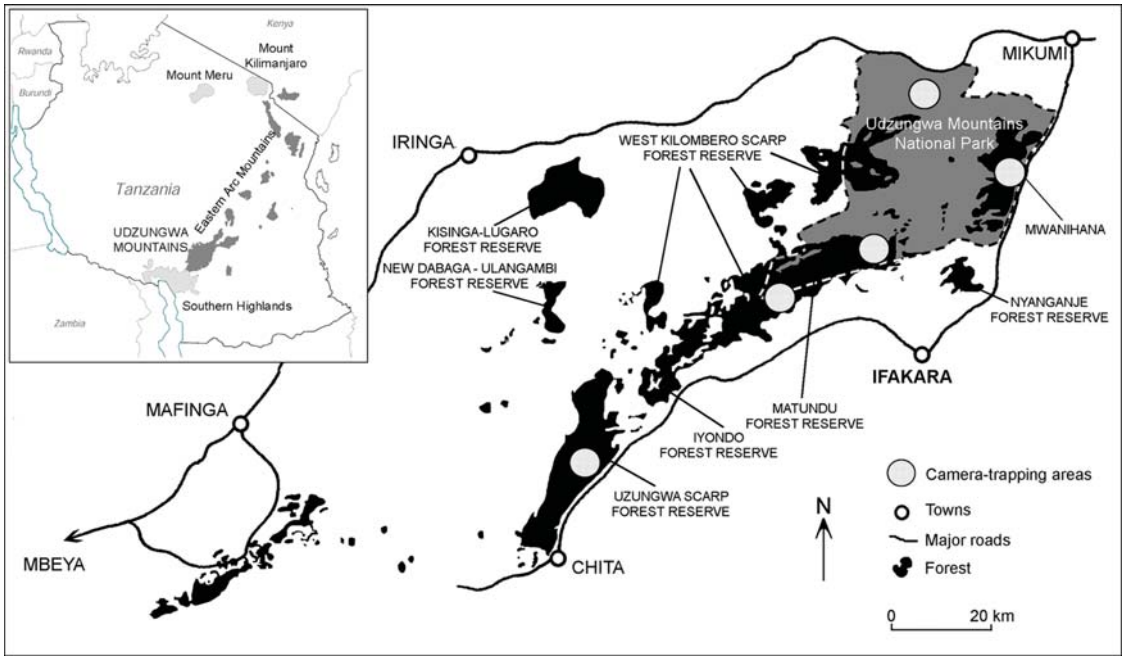

Figure 1 Map of the Udzungwa Mountains of south-central Tanzania. The major forests are named and the camera-trapping areas indicated. Inset shows the location of the Udzungwa Mountains within the Eastern Arc Mountains of Kenya and Tanzania (map created by A. Pallaveri, Museo Tridentino di Scienze Naturali).

globally threatened according to IUCN (2007) criteria, with eight species assessed as endangered and six as vulnerable. The kipunji is currently being assessed (Davenport et al. in press). Camera-trapping yielded a total of 2050 photographs representing 42 species. Of these, 16 species were carnivores and 14 were ungulates. Considering that we recorded 55 species that are terrestrial and large enough to trigger the camera-trap sensor (i.e., excluding small mammals and volant, fossorial and non-arboreal species), camera-trapping appears to be of critical importance for surveying forest mammals, as found in other studies in tropical areas (Silveira et al. 2003, Trolle 2003a,b).

The checklist shows that the Udzungwa Mountains are species-rich in terms of their mammalian fauna, confirming that the area is of outstanding importance for mammalian endemism and biogeography (Kingdon and Howell 1993, Dinesen et al. 2001, Stanley et al. 2005b, Rovero et al. in press b). The area was already classified as the site with the highest number of endemic and near-

Table 1 Features of the main habitat types in the Udzungwa Mountains of Tanzania.

Habitat type	Altitude range (m)	Dominant tree species	Description
Grassland and wooded grassland (WG)	300–1500	*Acacia* spp., *Brachystegia* spp.	Bracken and grassland with scattered trees
Woodland (W)	300–2000	Low elevation: *Commiphora* spp., *Adansonia digitata*; Low to mid elevation: *Brachystegia* spp., *Pterocarpus angolensis*; mid to high elevation: *Acacia* spp., *Uapaka kirkiana*	Deciduous woodland with low canopy (to 20 m) variable from very dense to open
Lowland forest (LF)	300–800	*Funtumia africana*, *Erythrophleum suaveolens*, *Treculia africana*, *Lettowianthus stellatus*, *Anthocleista grandiflora*, *Sorindeia madagascariensis*, *Parkia filicoidea*, *Pteleopsis myrtifolia*	Forest with deciduous and semi-deciduous trees, canopy 15–25 m with emergents to 50 m
Sub-montane forest (SF)	800–1400	*Parinari excelsa*, *Felicium decipiens*, *Harungana madagascariense*, *Allanblackia stuhlmannii*, *Trilepsium madagascariense*, *Isoberlinia scheffleri*	Moist forest with mainly evergreen species, canopy 25–40 m with emergents to 50 m
Montane forest (MF)[1]	1400–2600	*Parinari excelsa, Ocotea usambarensis, Hagenia abyssinica*, *Syzygium* sp., *Macaranga kilimandscharica, Caloncoba welwitschii*	Evergreen moist forest, with canopy height progressively lower with altitude

[1] MF includes upper montane forest (*sensu* Lovett 1993), which is above 1800 m and often contains bamboo towards the peaks of the mountains.

Table 2 Checklist of mammals of the Udzungwa Mountains of Tanzania.

Scientific name[1]	Common name	Detection	Habitat	Threat status	Source	Institution
Primates						
Cercopithecidae						
Rungwecebus kipunji	Kipunji	O	MF	In press	Jones et al. 2005, Davenport et al. in press	
Cercocebus galeritus sanjei[2]	Sanje mangabey	O, Ph	LF, SF, MF	EN	This study, Dinesen et al. 2001	MTSN
Cercopithecus mitis cf moloneyi	Sykes' monkey	O, Ph	LF, SF, MF	LC	This study, Dinesen et al. 2001	MTSN, WCS
Cercopithecus aethiops	Vervet monkey	O	W, LF	LC	This study	
Papio cynocephalus	Yellow baboon	O, Ph	W, LF	LC	This study, Dinesen et al. 2001	MTSN
Colobidae						
Procolobus gordonorum	Udzungwa red colobus	O	LF, SF, MF	VU	This study, Dinesen et al. 2001, Struhsaker et al. 2004	
Colobus angolensis palliatus	Angolan colobus	O	LF, SF, MF	LC	This study, Dinesen et al. 2001	
Galagonidae						
Galagoides[3] *zanzibaricus udzungwensis*	Udzungwa galago	O, Voc	W, LF, SF	Not listed	Butynski et al. 1998, 2006, A. Perkin personal communication	
Galagoides orinus	Mountain galago	O, Voc	MF	DD	Butynski et al. 1998, A. Perkin personal communication	
Galagoides granti	Grant's galago	O, Voc	MF	DD	A. Perkin personal communication	
Otolemur crassicaudatus	Greater galago	O, Ph, Voc	W, LF	LC	This study, Topp-Jørgensen et al. 2001a, A. Perkin personal communication	WCS
Otolemur garnettii	Small-eared galago	O, Voc	W	LC	A. Perkin personal communication	
Macroscelidea						
Macroscelididae						
Petrodromus tetradactylus	Four-toad elephant-shrew	O	W, LF, SF, MF	LC	This study	
Rhynchocyon cirnei reichardi	Chequered elephant-shrew	O, Ph	W, LF, SF, MF	NT	This study	MTSN
Rhynchocyon udzungwensis	Grey-faced elephant-shrew	O, Ph, T	SF, MF	Not listed	Rovero et al. in press b	MTSN, FMNH
Rodentia						
Anomaluridae						
Anomalurus cf derbianus	Lord Derby's anomalure	O, T	LF, SF, MF	LC	A. Marshall, M. Menengon, T. Jones and W. Stanley personal communication	UDSM
Gliridae						
Graphiurus murinus	Woodland dormouse	T	MF	LC	Tanzania Forest Conservation Group/MTSN unpublished data	UDSM
Muridae						
Acomys spinosissimus	Spiny mice	T	LF	LC	Stanley et al. 1998, 2005a	FMNH
Dasymys incomtus	African marsh rat	T	SF, MF	LC	Topp-Jørgensen et al. 2001b	FMNH
Grammomys dolichurus	Woodland thicket rat	T	LF	LC	Stanley et al. 1998, 2005a	FMNH
Grammomys ibeanus	Ruwenzori thicket rat	T	MF	LC	Stanley et al. 1998, 2005a	FMNH
Grammomys macmillani	MacMillan's thicket rat	T	LF, SF, MF	LC	Stanley et al. 1998, 2005a	FMNH
Hylomyscus arcimontensis	Tanzanian montane wood mouse	T	SF, MF	Not listed	Stanley et al. 2005a (as *H. denniae*), Carleton and Stanley 2005	FMNH
Lemniscomys griselda	Griselda's striped grass mouse	T	SF, MF	LC	Topp-Jørgensen et al. 2001b	FMNH
Lophuromys aquilus	Dark-coloured brush-furred rat	T	MF	LC	Stanley et al. 2005a (as *L. flavopunctatus*)	FMNH
Mastomys natalensis	Natal multimammate mouse	T	LF, SF	LC	Stanley et al. 2005a	FMNH
Mus minutoides	Pygmy mice	T	LF, SF	LC	Stanley et al. 2005a	FMNH
Mus triton	Grey-bellied pygmy mouse	T	MF	LC	Tanzania Forest Conservation Group/MTSN unpublished data[4]	FMNH
Otomys uzungwensis	Uzungwe vlei rat	T	MF	EN	Stanley et al. 1998 (as *U. anchietae*)	FMNH

(Table 2 continued)

Scientific name[1]	Common name	Detection	Habitat	Threat status	Source	Institution
Rattus rattus	House rat	T	LF	LC	Stanley et al. 1998, Stanley et al. 2005a	FMNH
Rhabdomys pumilio	Four-striped grass mouse	T	SF, MF	DD	Topp-Jørgensen et al. 2001b	FMNH
Praomys delectorum	East-African soft-furred rat	T	SF	NT	Stanley et al. 1998, 2005a	FMNH
Nesomyidae						
Beamys hindei	Lesser pouched rat	T	SF, MF	NT	Stanley et al. 1998	FMNH
Cricetomys gambianus	Giant pouched rat	Ph	Throughout	LC	This study	MTSN, WCS
Dendromus nyasae	Brant's climbing mouse	T	MF	LC	Stanley et al. 1998, 2005a (as *D. melanotis*)	FMNH
Dendromus nyikae	Nyika climbing mouse	T	SF	LC	Stanley et al. 1998	FMNH
Sciuridae						
Paraxerus vexillarious byatti	Swynnerton's bush squirrel	O, Ph, T	LF, SF	VU	This study, N. Cordeiro and D. Moyer personal communication	FMNH
Paraxerus lucifer	Tanganyika mountain squirrel	O, Ph, T	SF, MF	DD	This study, N. Cordeiro personal communication	UDSM
Hystricidae						
Hystrix cristata	Crested porcupine	Ph	Throughout	LC	This study	MTSN, WCS
Thryonomyidae						
Thryonomys swinderianus	Cane rat	O	WG, LF, MF	LC	This study, D. Moyer and M. Menegon personal communication	
Afrosoricida						
Chrysochloridae						
Chrysochloris stuhlmanni	Stuhlmann's golden mole	T	MF	LC	Tanzania Forest Conservation Group/MTSN unpublished data	UDSM
Insectivora						
Soricidae						
Crocidura elgonius	Elgon shrew	T	LF, SF	LC	Stanley et al. 1998, 2005a	FMNH
Crocidura desperata	Desperate shrew	T	MF	EN	Hutterer et al. 1991	FMNH
Crocidura fuscomurina	Tiny musk shrew	T	SF	LC	Stanley et al. 2005a	FMNH
Crocidura hildegardeae	Hildegarde's shrew	T	SF	LC	Stanley et al. 1998, 2005a	FMNH
Crocidura luna	Musk shrew	T	SF, MF	LC	Stanley et al. 2005a	FMNH
Crocidura olivieri	Olivier's shrew	T	LF, SF	LC	Stanley et al. 1998, 2005a	FMNH
Crocidura viaria suahelae	Savannah path shrew	T	LF, SF	LC	Stanley et al. 2005a	FMNH
Crocidura monax	Rombo shrew	T	?	DD	Stanley et al. 1998	FMNH
Crocidura telfordi	Telford's shrew	T	?	EN	Stanley et al. 1998	FMNH
Sylvisorex megalura	Climbing shrew	T	SF	LC	Stanley et al. 1998, 2005a	FMNH
Myosorex kihaulei	Mouse shrew	T	MF	EN	Stanley and Hutterer 2000	FMNH
Congosorex phillipsorum	Phillips' Congo shrew	T	MF	Not listed	Stanley et al. 2005b	FMNH
Carnivora						
Canidae						
Canis adustus	Side-striped jackal	S,O	LF, MF, WG	LC	De Luca and Mpunga 2005a, M. Menegon personal communication	
Lycaon pictus	Wild dog	S	WG	EN	De Luca and Mpunga 2005a	
Mustelidae						
Aonyx capensis	African clawless otter	O	LF, SF	LC	This study, De Luca and Mpunga 2005a	WCS (skin)
Ictonyx striatus	Zorilla	Int	?	LC	De Luca and Mpunga 2005a	
Poecilogale albinucha	Striped weasel	O	W	LC	De Luca and Mpunga 2005a	
Mellivora capensis	Honey badger (Ratel)	Ph	Throughout	LC	This study, De Luca and Mpunga 2005a	MTSN, WCS

(Table 2 continued)

Scientific name[1]	Common name	Detection	Habitat	Threat status	Source	Institution
Viverridae						
Genetta genetta	Common genet	Ph	W, LF, SF	LC	This study, De Luca and Mpunga 2005a	MTSN, WCS
Genetta maculata	Large spotted genet	Ph	W, LF, SF	LC	This study, De Luca and Mpunga 2005a	MTSN, WCS
Genetta servalina lowei	Lowe's servaline genet	Ph	LF, SF, MF	LC	This study, De Luca and Mpunga 2005a	MTSN, WCS
Civettictis civetta	African civet	Ph	Throughout	LC	This study, De Luca and Mpunga 2005a	MTSN, WCS
Nandiniidae						
Nandinia binotata	African palm civet	Ph	LF, SF, MF	LC	This study, De Luca and Mpunga 2005a	MTSN, WCS
Herpestidae						
Herpestes sanguinea	Slender mongoose	O	LF	LC	De Luca and Mpunga 2005a	
Helogale parvula	Dwarf mongoose	Int	WG, W	LC	De Luca and Mpunga 2005a	
Mungus mungo	Banded mongoose	Ph	WG, W, LF	LC	This study, De Luca and Mpunga 2005a	MTSN, WCS
Atilax paludinosus	Marsh mongoose	Ph	LF, SF, MF	EN	This study, De Luca and Mpunga 2005a	MTSN, WCS
Ichneumonia albicauda	White-tailed mongoose	Ph	W, WG	LC	De Luca and Mpunga 2005a	WCS
Rhynchogale melleri	Meller's mongoose	Ph	SF	LC	De Luca and Mpunga 2005a	WCS
Bdeogale crassicauda	Bushy-tailed mongoose	Ph	W, LF, SF, MF	LC	This study, De Luca and Mpunga 2005a	MTSN, WCS
Bdeogale jacksoni	Jackson's mongoose	Ph	LF	VU	De Luca and Rovero 2006	MTSN, WCS
Hyaenidae						
Crocuta crocuta	Spotted hyaena	Ph	Throughout	CD	This study, De Luca and Mpunga 2005a	MTSN, WCS
Proteles cristatus	Aardwolf	Rk	W, WG	LC	De Luca and Mpunga 2005a	
Felidae						
Felis sylvestris	Wild cat	S	LF	LC	De Luca and Mpunga 2005a	
Felis serval	Serval	Ph, O	W, WG, LF	LC	De Luca and Mpunga 2005a, M. Menegon personal communication	WCS
Felis caracal	Caracal	Ph	W, WG	LC	De Luca and Mpunga 2005a	WCS
Panthera pardus	Leopard	Ph	Throughout	LC	This study, De Luca and Mpunga 2005a	MTSN, WCS
Panthera leo	Lion	S, O	Throughout	VU	This study, De Luca and Mpunga 2005a, T. Jones personal communication	
Pholidota						
Manidae						
Manis temminckii	Ground pangolin	O	LF	NT	A. Marshall personal communication	
Tubulidentata						
Orycteropodidae						
Orycteropus afer	Aardvark	Ph	W, WG, LF, SF	LC	This study	MTSN, WCS
Hyracoidea						
Procaviidae						
Dendrohyrax arboreus	Eastern tree hyrax	O, Voc, Ph	LF, SF, MF	LC	This study	MTSN
Heterohyrax brucei	Yellow-spotted hyrax	skull	MF	LC	Topp-Jørgensen et al. 2001a	
Proboscidea						
Elephantidae						
Loxodonta africana	African elephant	Ph, O	Throughout	VU	This study	MTSN, WCS

(Table 2 continued)

Scientific name[1]	Common name	Detection	Habitat	Threat status	Source	Institution
Artiodactyla						
Suidae						
Potamochoerus larvatus	Bush pig	Ph, O	Throughout	LC	This study	MTSN, WCS
Phacochoerus africanus	Warthog	Ph, O	W,LF	LC	This study	WCS
Bovidae						
Philantomba monticola	Blue duiker	Ph, O	SF, MF		This study	MTSN
Cephalophus harveyi	Harvey's duiker	Ph, O	W, LF, SF, MF	CD	This study, Rovero and Marshall 2005	MTSN, WCS
Cephalophus spadix	Abbott's duiker	Ph	LF, SF, MF	EN[4]	This study, Rovero et al. 2005	MTSN, WCS
Hippopotamus amphibius	Hippopotamus	Ph, O	LF	LC	This study	MTSN, WCS
Hippotragus niger	Sable antelope	Ph, O	W, WG	CD	This study	WCS
Madoqua kirkii	Kirk's dikdik	Ph	W	LC	This study	WCS
Neotragus moschatus	Suni	Ph, O	LF, SF, MF	CD	This study, Rovero et al. 2005	MTSN, WCS
Kobus ellipsiprymnus	Water buck	Ph	LF, W	CD	This study	MTSN, WCS
Syncerus caffer	African buffalo	Ph, O	Throughout	CD	This study	MTSN, WCS
Sylvicapra grimmia	Bush duiker	Ph	W, WG	LC	This study	WCS
Tragelaphus strepsiceros	Greater kudu	Ph	W	CD	This study	WCS
Tragelaphus imberbis	Lesser kudu	Ph	W	CD	This study, A. Perkin personal communication	WCS
Tragelaphus scriptus	Bushbuck	O	W, LF, SF, MF	LC	This study, Rovero et al. 2005	
Taurotragus oryx	Eland	Int, O	G, W	CD	This study, T. Jones personal communication	
Nesomyidae						
Epomophorus wahlbergi	Wahlberg's epaluetted fruit bat	T	LF, SF	LC	This study, L. Trentin unpublished data	MTSN
Lissonycteris angolensis	Angolan fruit bat	T	SF, MF	LC	Stanley et al. 2005a	FMNH
Myonycteris relicta	East-African little collared fruit bat	T	SF	VU	Stanley et al. 2005a	FMNH
Rousettus aegyptiacus	Egyptian fruit bat	T	LF, SF	LC	L. Trentin unpublished data, Stanley et al. 2005a	FMNH
Nycteridae						
Nycteris hispida	Hairy slit-faced bat	T	LF	LC	Stanley et al. 2005a	FMNH
Vespertilionidae						
Neoromicia capensis	Cape serotine bat	T	SF	LC	Stanley et al. 2005a	FMNH
Glauconycteris variegata	Butterfly bat	T	LF	LC	L. Trentin unpublished data	MTSN
Myotis welwitschii	Welwitch's bat	T	SF, MF	LC	Brink et al. 2001b	UDSM, FMNH
Miniopterus fraterculus	Lesser long-fingered bat	T	MF	LC	Brink et al. 2001a,b, L. Trentin unpublished data	UDSM
Miniopterus sp.	–	T	MF	–	Topp-Jørgensen et al. 2001b	UDSM
Kerivoula argentata	Damara woolly bat	T	LF	LC	L. Trentin unpublished data	MTSN
Pipistrellus sp.	–	T	MF	–	Brink et al. 2001b	UDSM
Hipposideridae						
Hipposideros ruber	Noack's roundleaf bat	T	LF, SF, MF	LC	Brink et al. 2001b, L. Trentin unpublished data	UDSM, MTSN
Hipposideros cyclops	Cyclops roundleaf bat	T	LF, SF	LC	L. Trentin unpublished data, Stanley et al. 2005b	FMNH
Rhinolophus deckenii	Decken's horseshoe bat	T	LF	DD	L. Trentin unpublished data, Stanley et al. 2005b	FMNH
Rhinolophus simulator	Bushveld horseshoe bat	T	MF	LC	Brink et al. 2001b	UDSM
Rhinolophus clivosus	Geoffroy's horseshoe bat	T	MF	LC	Brink et al. 2001a,b	UDSM
Rhinolophus hildebrandti	Hildebrandt's horseshoe bat	T	LF, SF	LC	L. Trentin unpublished data	MTSN

(Table 2 continued)

Scientific name[1]	Common name	Detection	Habitat	Threat status	Source	Institution
Species of possible occurrence[5]						
Galagoides senegalensis	Senegal galago	Int		LC	D. Moyer and A. Perkin personal communication	
Canis mesomelas	Black-backed jackal	Int		LC	De Luca and Mpunga 2005a	
Otocyon megalotis	Bat-eared fox	Int		LC	De Luca and Mpunga 2005a	
Herpestes ichneumon	Egyptian mongoose	Int		LC	De Luca and Mpunga 2005a	
Hyaena hyaena	Striped hyaena	Int		NT	De Luca and Mpunga 2005a	
Acinonyx jubatus	Cheetah	Int		VU	De Luca and Mpunga 2005a	
Redunca redunca	Bohor reedbuck	Int		CD	D. Moyer personal communication	
Oreotragus oreotragus	Klipspringer	Int		CD	This study, A. Bowkett personal communication	
Atelerix albiventris	African hedgehogs	Int		LC	This study	
Pronolagus rupestris	Smith's red rock hare	Int		LC	D. Moyer and A. Bowkett personal communication	
Paraxerus cf. cepapi	Smith's bush squirrel	Int		LC	D. Moyer personal communication	
Heliosciurus cf undulatus	Gambian sun squirrel	Int		LC	This study	

Detection: O, observed; Ph, photo-trapped; T, trapped; Voc, vocalisation; S, scat; Sp, spoor; Rd, road kill; Int, interview (species claimed to be present by at least 60% of interviewees were included). Habitat (see Table 1): WG, grassland and wooded grassland; W, dry woodland; LF, lowland forest; SF, sub-montane forest; MF, montane forest including upper montane and bamboo. Threat status follows IUCN (2007): EN, endangered; VU, vulnerable; CD, conservation dependent; NT, near threatened; LC, least concern; DD, data deficient. Institutions where voucher specimens or photographs are found (for species trapped or camera-trapped): FMNH, Field Museum of Natural History; MTSN, Museo Tridentino di Scienze Naturali; UDSM, University of Dar es Salaam; WCS, Wildlife Conservation Society – Southern Highlands Conservation Programme.

[1] Taxonomy follows Wilson and Reeder (2005), unless otherwise stated.

[2] Sanje mangabey is considered a sub-species by Grubb et al. (2003); however, it is given full species status by others (Kingdon 1997, Wilson and Reeder 2005).

[3] The genus *Galagoides* is adopted by Grubb et al. (2003).

[4] Abbott's duiker has been re-assessed in 2006 as IUCN Endangered by D. Moyer, T. Jones and F.R.

[5] Claimed by 25–50% of interviewees or unconfirmed/uncertain record.

endemic mammals within the Eastern Arc Mountains. The Udzungwa Mountains are unique in comparison to other Eastern Arc Mountains in terms of both the greater size of forested areas and greater altitudinal range of forest cover. Moreover, the broad variation of habitat types that mainly occur within the National Park means that the Udzungwa Mountains support mammals from both dry and moist habitats.

Although some mammal groups have been thoroughly researched, especially carnivores, diurnal primates and forest antelopes, knowledge on the distribution, abundance and conservation status of many taxa is still very limited. Moreover, we conducted most of our camera-trap surveys inside the National Park, and therefore we do not have records for many species in other sites. Taxa needing future attention include: nocturnal primates; kipunji; Sanje mangabey; small carnivore species that were recorded sporadically and/or indirectly (e.g., Meller's mongoose, serval, caracal, wild dog and wild cat); Abbott's duiker; and dry habitat antelopes (e.g., sable, greater and lesser kudu, eland). Among the smaller species, sampling of small mammals and bats was limited to a few sites, and little information is likewise available for giant sengis, squirrels and hyraxes. Considering the number of species that have been discovered recently, namely the kipunji, Phillips' Congo shrew and the grey-faced sengi, further survey work focussed especially on small mammals might still reveal new records and/or new species.

The main threats to Udzungwa's mammals are hunting and habitat degradation and loss (Dinesen et al. 2001, Nielsen 2006, this study). The most serious encroachment is happening in the forest reserves, which are not adequately protected under the current management regimes (Rovero and Menegon 2005, Burgess et al. 2007). In addition to hunting, which targets mainly ungulates (De Luca and Mpunga 2005a), firewood collection, farming, and tree cutting are routinely conducted and the impact on the mammal fauna is evident. Firewood collection has been allowed in the National Park since its establishment in 1992 and this is having a serious impact on the microfauna associated with the forest floor (Nyundo et al. 2006), and probably on ground-dwelling mammals such as the Sanje mangabey and duikers. The most important causes of habitat degradation are logging and cultivation. Intense commercial logging occurred in the 1970s (Dinesen et al. 2001); however, selective logging of timber tree species has been reported from many forest reserves (Dinesen et al. 2001, A. Marshall personal communication, this study). The loss of connectivity between Udzungwa forest patches is a potential threat to the viability of many populations, especially threatened species such as Abbott's duiker and the Sanje mangabey that occur in isolated populations. Dry season bushfires, and farming and settlements in some areas, are the main causes preventing natural restoration of connectivity among forest patches (Dinesen et al. 2001). Similarly, the isolation of the Udzungwa Mountains from adjacent ecosystems (the Ruaha and Rubeho Mountains and Selous Game Reserve) is increasing as more people move closer to protected areas (Schipper and Burgess 2004). Initiatives aimed at assessing connectivity and evaluating options for restoring wildlife corridors are currently being implemented.

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