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Mammals of the riverine forests of the Jubba Valley

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SUMMARY

A study of the mammal community of the Jubba forests and an assessment of the threats to their populations were made between July and September 1986. Records were kept of all sightings and spoors of the larger species; smaller species were captured using traps and bats were caught using mist nets. Captures were weighed, measured and their reproductive status noted. Local villagers were questioned about the species of mammal they encountered in the forests, their hunting practices and the seasonal movements of mammals in the Jubba Valley.

Thirty-two species of mammal were recorded in the forests. Several of the species recorded are rare or have a limited distribution within Somalia such as *Nycteris parisii*, *Cercopithecus mitis* and *Panthera pardus*, and two species of bat *Pipistrellus eisenrauti* and *Scotoecus albigula* were new records for Somalia. These forests also provide an important habitat for several other species whose populations in Somalia have declined in recent years and for species which use the forest seasonally.

Local hunters kill mostly waterbuck *Kobus ellipsiprymnus*, bushbuck *Tragelaphus scriptus* and red forest duiker *Cephalopus natalensis* in the forests. Hunting is most intense during the dry seasons, when bushland species move into the riverine habitats.

The remaining forest along the Jubba probably still contains all of the typical mammal species. Unfortunately, forest clearance and hunting is continuing. A proposed dam at Baardheere and a campaign to eradicate tsetse-fly from the Jubba forests pose further threats to the forest mammals. Unless urgent action is taken to properly safeguard these forests and adjacent areas the loss of the riverine forest mammal community from Somalia seems inevitable.

INTRODUCTION

The Somali Democratic Republic once possessed large areas of riverine forest along the Jubba and Shabeelle rivers in the south of the country (Pichi-Sermolli, 1957). However, these forests have been largely destroyed or seriously degraded over the last 50 years through clearance for agriculture and overexploitation for timber, fuelwood and fodder. Those along the Shabeelle have been almost completely destroyed and the largest remaining areas of riverine forest in Somalia now occur in the Middle Jubba, between Bu'aale and Jilib (Madgwick et al., 1988).

The national importance of the Jubba forests has long been recognised. Calls for their protection were first made over 20 years ago (Funaioli and Simonetta, 1966) and have been repeated several times since (Abel and Kille, 1975; Simonetta and Simonetta, 1983; Madgwick et al., 1986, 1988). However, there has been insufficient knowledge of the ecology of these forests to

formulate adequate management policies for their conservation. There have been no systematic surveys of the flora and fauna of the Jubba forests and even basic data such as which species are present are largely incomplete. Among the mammals, chiroptera, insectivora and rodentia of these forests are particularly poorly known.

Part of the program of the Somalia Research Project was to conduct surveys of the forest mammals and collect information on the ecology of the species present. In addition, an assessment was made of the incidence and likely impact of local hunting on some of the forest mammal species.

STUDY SITES

The mammal surveys were conducted at three forest sites; Shoonto North, Shoonto South and Barako Meadow, situated in two forest reserves, «Shoonto» (276ha) and «Barako Meadow» (140ha), between Bu'aale and Jilib (Figure 1). The presence of mammals was also recorded on a casual basis at other forest areas visited by the Project. The composition and structure of the forest vegetation at these sites has been described by Madgwick (this volume). Nine to 13 days were spent at each site.

METHODS

Four methods were used to gather information on the forest mammals.

1. Records were kept of all sightings of the larger species and photographs, measurements and notes were made of any tracks, trails, burrows and droppings encountered.

2. Small mammals were captured using commercial snap-traps baited with a mixture of maize, banana, oats and peanut butter. Lines of 50 traps were placed singly at 5m intervals on the forest floor and checked twice daily for 2-6 (usually 4) consecutive days. There was no prebaiting period. Traps were arranged so that the river edge, mid-levee and dhesheeq-forest edge were all sampled.

3. Bats were caught in mist nets set 0.3-3.0m off the ground and positioned along tracks and in clearings in the forests. Nets were checked at 0600hr and 1800hr for 8-11 days at each site.

Measurements of the length of the head and body, tail, hind foot and ear were made on each small mammal and bat captured, and radius/ulna length was also recorded for each bat. The sex, reproductive condition and capture location of every specimen was also noted. In addition, the alimentary canals of each small mammal caught were excised whole and stored in 10% formalin for subsequent microscopical examination of food remains.

Where possible, one or more specimens of each species of small mammal and bat were preserved for identification by the British Museum (Natural History), London.

4. Hunters from 5 villages around the study sites were questioned about

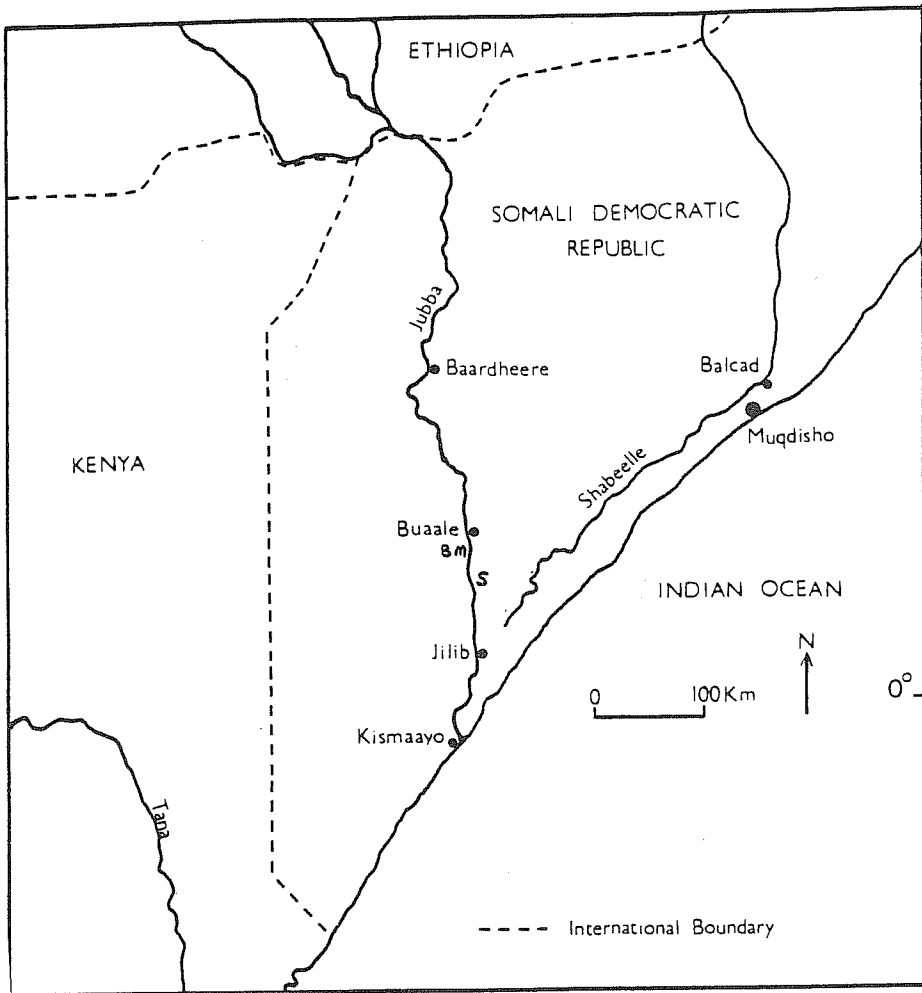


FIG. 1 - Map of Southern Somalia, showing location of the two forest reserves along the Jubba River, Barako Madow (BM) and Shoonto (S).

their hunting practices, the mammals which occurred in the forests and the seasonal movements of mammals in the Jubba Valley. A standard questionnaire was used at each village.

FOREST MAMMALS

A total of 32 species of mammal were recorded in the forests, including 4 species of primate, 8 species of bat and 7 species of rodent (Table 1). The species list is certainly incomplete. In particular, the bat and small mammal groups are probably still underrecorded, especially the arboreal rodents and canopy-dwelling bats, which were not sampled.

Table 1. Mammals recorded in the riverine forests of the Jubba Valley, July-September 1986 by the S.R.P.

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<u>Epomophorus wahlbergi</u>	Wahlberg's epauletted fruit bat
<u>Nycteris parisii</u>	Parisi's slit-faced bat
<u>Cardioderma cor</u>	African false vampire bat
<u>Hipposideros commersoni</u>	Commerson's leaf-nosed bat
<u>Pipistrellus eisentrauti</u>	Eisentraut's bat
<u>Scotophilus dinganii</u>	African yellow house bat
<u>Nycticeinops schlieffenii</u>	Schlieffen's twilight bat
<u>Scotoecus albigula</u>	House bat
<u>Galago crassicaudatus</u>	Greater bushbaby
<u>Galago senegalensis</u>	Lesser bushbaby
<u>Cercopithecus mitis</u>	Blue monkey
<u>Papio cynocephalus</u>	Yellow baboon
<u>Panthera pardus</u>	Leopard
<u>Mellivora capensis</u>	Honey badger
<u>Herpestes sanguineus</u>	Slender mongoose
<u>Helogale parvula</u>	Dwarf mongoose
<u>Genetta tigrina</u>	Large-spotted genet
<u>Orycteropus afer</u>	Aardvark
<u>Hippopotamus amphibius</u>	Hippopotamus
<u>Potamochoerus porcus</u>	Bushpig
<u>Tragelaphus scriptus</u>	Bushbuck
<u>Kobus ellipsiprymnus</u>	Common waterbuck
<u>Cephalophus natalensis</u>	Red forest duiker
<u>Madoqua sp.</u>	Dik-dik
<u>Syncerus caffer</u>	African buffalo
<u>Paraxerus ochraceus</u>	Huet's bush squirrel
<u>Tatera robusta</u>	Fringe-tailed gerbil
<u>Saccostomus mearnsi</u>	Pouched mouse
<u>Praomys (Mastomys) natalensis</u>	Multimammate rat
<u>Acomys dimidiatus</u>	Spiny mouse
<u>Thamnomys (Grammomys) dolichurus</u>	Tree rat
<u>Hystrix cristata</u>	Crested porcupine

Large mammals. Except for the primates, the larger species were rarely sighted. This may have been because these species are truly scarce, perhaps due to hunting pressure or because they naturally occur at low density, but many, such as bushpig, are predominately nocturnal anyway. Local hunters reported regularly seeing serval *Felis serval* and civet *Viverra civetta* in these forests and occasionally lesser kudu *Tragelaphus scriptus* and warthog *Phacochoerus aethiopicus*, which we did not record. The majority of the burrows of aardvark and honey badger appeared to be unoccupied.

Local hunters reported that many of the large mammal species concentrate in riverine habitats during the dry season, presumably in search of fresh vegetation. Hunters often encounter African buffalo, waterbuck, bushbuck and lesser kudu in the forests during this period and oryx *Oryx beisa*, elephant *Loxodonta africana*, giraffe *Giraffa camelopardis* are sometimes seen along the forest edge. Many of the larger carnivores, such as lion *Panthera leo*, are also reported to move into riverine areas at this time following the movements of the game species.

Bats. A total of 58 bats of 8 species were recorded at the study sites (Table 2). *Epomophorus wahlbergi* was by far the most commonly caught

species of bat in the forests. *Ficus sycomorus* and *Garcinia livingstonei* were in fruit during our visit and may have attracted numbers of these bats to the forests from surrounding areas. However, the greater number of *E. wahlbergi* captured may not have been a true reflection of its relative abundance, because, since this species relies on its eyesight rather than echolocation to navigate, it is probably more likely to be captured in mist nets at night than the other, insectivorous species.

Several of these species are rare. *Pipistrellus eisentrautii* is only known from Cameroon and from one specimen from Kenya (J.E. Hill, pers. comm.) and is a new record for Somalia. *Nycteris parisii* has been recorded from Cameroon, Ethiopia and one specimen from the lower Shabeelle (Hayman and Hill, 1971; Hill, 1975). *Hipposideros commersoni* is reportedly rare in Somalia and having only been recorded from the Jubba Valley (Funaioli, 1971), but is probably more common in the forests than the captures indicated because it tends to be gregarious, occurring locally in often very large numbers, and is apparently adept at avoiding mist nets (Kingdon, 1974a). *Scotoecus albigula* is also a new record for Somalia.

Every species except *Hipposideros commersoni* showed signs of breeding (Table 2). Interestingly, all 27 *E. wahlbergi* captured at Barako Madow were breeding females or sub-adults netted within 50m of each other, suggesting that there was a maternity/nursery roost closeby in the forest.

Small mammals. A total of 63 rodents of 5 species were caught in the forests (Table 3), during 1820 trap nights. Overall capture success was only 4.5% (traps where bait had been removed by ants or other animals were excluded from this calculation). *Acomys dimidiatus* was the most commonly caught rodent and was captured on the mid-levee, along the forest-dhesheeq edge and in the adjoining rank herbaceous vegetation of the dhesheeq margin, but not in the traps set along the river bank. *Acomys dimidiatus* was

Table 2 Bats caught in the Jubba forests, August - September 1986

L = presence of lactating female

Species	No of individuals	Proportion in reproductive condition		
		Male	Female	Total
<i>Epomophorus wahlbergi</i>	39	5/10	15/29 (L)	20/39
<i>Pipistrellus eisentrautii</i>	8	3/4	3/4 (L)	6/8
<i>Cardioderma cor</i>	6	4/4	2/2 (L)	6/6
<i>Nycteris parisii</i>	1	1/1	-	1/1
<i>Hipposideros commersoni</i>	1	0/1	-	0/1
<i>Scotophilus dinganii</i>	1	-	1/1	1/1
<i>Nycticeinops Schlieffenii</i>	1	1/1	-	1/1
<i>Scotoecus albigula</i>	1	1/1	-	1/1

Table 3 Small rodents caught in the Jubba forests, August - September 1986

L = presence of lactating females

Species	No of individuals	Proportion in reproductive condition		
		Male	Female	Total
<i>Acomys dimidiatus</i>	32	14/18	12/14 (L)	26/32
<i>Praomys natalensis</i>	20	10/12	2/8 (L)	12/20
<i>Thamnomys dolichurus</i>	8	1/3	3/5	4/8
<i>Saccostomus mearnsi</i>	2	1/1	0/1	1/2
<i>Tatera robusta</i>	1	-	0/1	0/1

most frequently captured in clearings in the forest where herbaceous vegetation was often dense. *Praomys natalensis* were only trapped at Shoonto South and almost all were caught along or close to an old logging track, where ground vegetation was also dense. The two specimens of *Saccostomus mearnsi* were similarly captured at Shoonto South along a disused logging track. The capture of *Thamnomys dolichurus* was unexpected since this species is considered an arboreal species and is rarely captured on the ground (Delany, 1975). However, all 8 captures were from traps positioned at the base of trees.

Analysis of stomach contents revealed that all 5 species relied heavily on seeds and the proportion of animals with invertebrate material in their guts was also high (Table 4). A more detailed analysis of the stomach material of the captures is given in Varty (1990).

All species except *Tatera robusta* showed signs of breeding (Table 3). Reproduction in many small rodents inhabiting dry areas in East Africa, including *Praomys natalensis* and *Thamnomys dolichurus*, usually ceases or is markedly reduced during the dry season (Field, 1975; Neal, 1984; Taylor and Green, 1976), which has been linked to a scarcity of seeds and green vegeta-

Table 4 Diet of trapped rodents in Jubba forests, revealed by

microscopical examination of stomach contents
(Expressed as mean percentage of relative volume)
No. of stomachs examined given in parentheses

	Species				
	<u>A. dimidiatus</u> (30)	<u>P. natalensis</u> (18)	<u>T. dolichurus</u> (8)	<u>S. meansi</u> (2)	<u>T. robusta</u> (1)
Monocotyledons	17	14	28	11	18
Dicotyledons	14	0	7	42	3
Seed	53	82	56	44	75
Invertebrates	13	4	2	3	1
Other vegetable material (flowers, bark, etc)	3	0	7	0	3

tion during this period (Delany, 1975; Kingdon, 1974b; Neal, 1977, 1982). The high proportion of seeds in the diet of the rodents suggests that food may be plentiful in the Jubba forests in the dry season and may account for the apparently extended breeding period.

COMMENTS ON THE MAMMAL COMMUNITY

The mammal community of these forests is very similar to that recorded in the riverine forests along the Shabeelle Valley (Simonetta and Simonetta, 1983; Varty, 1987) and possesses many species in common with the riverine forests along the Tana River, Kenya, including blue monkey, waterbuck, red forest duiker, *Thamnomys dolichurus*, *Paraxerus ochraceus* and a species of *Acomys*. However, the Tana forests support additional forest species not found in Somalia, namely two species of monkey, the Tana River Red Colobus *Colobus badius rufomitratu*s and the Tana River mangabey *Corcocebus galeritus galeritus* and the squirrel *Heliosciurus rufobrachium*. The lower species richness of the Jubba forests and the lack of specialised forest forms is probably largely a reflection of their small size and distance from the sites of species endemicity in East Africa (Rogers et al., 1982). This absence of more forest-adapted forms probably accounts for the presence of species such as *Cardioderma cor*, *Nycticeinops schlieffenii*, *Acomys dimidiatus* and *Tatera robusta*, which are usually associated with much drier habitats (Kingdon, 1974a, b). Flooding may also exert a significant influence on the composition of the forest mammal community, because of the risk of drowning. The larger burrowers, such as honey badger, aardvark and porcupine, may be only temporary residents, as suggested by the presence of many apparently unoccupied burrows, or they occupy the higher, drier areas of the forest. The populations of small ground-dwelling rodents in the forests are probably largely exterminated by major floods and reestablished each dry season by immigration from populations in the neighbouring drier woodland and bush areas. The capture sites of *Praomys natalensis* and *Saccostomus mearnsi* suggests that logging tracks may be one route of invasion into the forest.

MUNTING

Although hunting has been illegal in Somalia since 1971 it is still widespread (Fagotto, 1985). An assessment of the incidence and likely impact of local hunting on the forest mammal populations was made from interviews with hunters from five villages around the three forest sites.

Villagers hunt in both forest and bush taking different species from each. Red forest duiker, bushbuck and waterbuck were the three species most commonly taken in the forests; lesser kudu, dik-dik and gerenuk *Litocranius walleri* were the most common prey in the bush areas. Clandestine bands of armed «shifta» also hunt in the forest, taking even the largest game, such as African buffalo.

Hunting was reported to be most intense during the dry seasons, when many bushland species moved closer to the river. However, some villagers preferred to hunt in the forests only during the wet seasons, relying on goats and cattle bought from the nomads or game meat purchased from the «shifta» during the dry seasons.

Several hunting methods were used by villagers including rope traps, said to be the most common hunting method, gin traps and the bow and arrow, sometimes poisoned with «marit», a substance derived from the tree *Acokanthera schimperi* (family Apocynaceae, local name «geed marat»). None of the men interviewed admitted to possessing a firearm.

Hunting is principally for meat, which was generally consumed within the family. Many villagers commented that they spent less time hunting than formerly because of the current scarcity of game and claimed that only a small proportion of the men in a village, generally only one or two, now hunted regularly. This is undoubtedly an understatement since some villagers were reluctant to discuss their activities for fear of prosecution. However, many villagers felt that tending crops was a much more profitable use of their time, particularly since they could obtain meat from other sources. Little is known about the impact of «shifta» in the Jubba Valley but a local National Range Agency Official claimed that the incidence of armed groups in the region had increased considerably since 1980.

DISCUSSION

Riverine forest extended along most of the Middle and Lower Jubba Valley at the beginning of the current century (Perchi-Sermolli, 1957). Unfortunately much of the forest has been cleared. Approximately 5000 ha of forest remained in the Middle Jubba in 1960. By 1984, 3000ha of this had been cleared for agriculture and at the end of 1986 only about 1000ha remained along the entire Middle Jubba (Madgwick et al., 1986; I. Desmuth, pers. comm.). Recent droughts have increased pressure on the forests for fodder and meat. The 1986-1987 drought in Somalia was particularly severe and there were further encroachments into the Jubba forests. Despite this destruction, the remaining patches of riverine forest along the Jubba Valley probably still contain representatives of all the typical mammal species.

A number of the species occurring in these forests are rare or have a very limited distribution within Somalia. Of particular importance are Parisi's slit-faced bat and Eisentraut's bat, which are only known from a few specimens, mostly from the Cameroon. Two other species of bats recorded in these forests, Commerson's leaf-nosed bat and the house bat *Scotoecus albigula*, are only known from the Jubba Valley within Somalia. Also of note is the blue monkey, which is restricted to the few remaining patches of riverine forest along the Jubba and Shabeelle, the red forest duiker which, according to Simonetta and Simonetta (1983), is now rare, and the greater bushbaby, which has also become less common in Somalia in recent years (Simonetta

and Simonetta, 1983). The Jubba forests are therefore of considerable national importance particularly because the only other significant stretches of riverine forest in Somalia, along the Shabeelle, have been almost completely destroyed or are so badly degraded that they are probably beyond recovery. [The mammal fauna of the forests of the Holawajur area in the extreme south of the Somalia has not been properly studied and consequently an assessment of their importance cannot be made. However, it is likely to differ from that of the Jubba forests because the vegetation of the Holawajir forests is not riverine].

The forests are of additional conservation value because they provide a refuge for a number of species which are becoming increasingly uncommon, such as the leopard, waterbuck and bushbuck.

As well as deforestation, the forests are also threatened by a proposed dam to be built at Baardheere. Since this is likely to alter the extent and timing of flooding of the forests downstream, regeneration of at least some of the species of forest tree may be adversely affected (Hughes, 1984).

There has also been a recent proposal to reduce the numbers of tsetse-fly *Glossina* spp. along the Jubba Valley by spraying the forests with insecticide. This is likely to damage the forest mammal community for two reasons. First, since the insecticides may kill non-target insects, insect-eating mammals, notably the microchiropteran bats, may suffer a reduction in their food supply and a build-up of insecticide residues in their body tissues. Second, reduction in the number of tsetse-fly will increase the use of the forests by nomads. Within two years of spraying stretches of forest along the Shabeelle River, 60% of the vegetation had been destroyed or badly degraded by nomads and their livestock (M. Abdirahman, pers. comm.).

Although hunting in the Jubba forests may be less common than formerly even a small hunting pressure may have serious consequences for the remaining mammal populations, especially the rarer and more restricted species, such as the red forest duiker. Tighter controls on illegal hunting in these forests are urgently needed.

A detailed management plan for the conservation of the largest remaining patches of forest occurring along the Jubba, that combines the protection of the flora and fauna with sustainable development of the forest and the surrounding area, has been produced (Madgwick et al., 1988). However, it has yet to be implemented.

CONCLUSION

The mammal community of the Jubba forests contains several species that are rare or restricted and is probably unique within Somalia. These forests are therefore of major conservation value. However, they continue to be threatened by clearance and other human activities. Unless urgent action is taken to safeguard these forests, the loss of a number of these species from the Jubba Valley, and possibly Somalia, seems inevitable.

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