

## Short communication

**MAMMALS OF THE MAZIE NATIONAL PARK, SOUTHERN NATIONS,  
NATIONALITIES AND PEOPLES REGIONAL STATE, ETHIOPIA**Dawd Yimer<sup>1</sup> and Solomon Yirga<sup>2,\*</sup><sup>1</sup>Department of Natural Sciences, Gondar Teachers College, Gondar, Ethiopia<sup>2</sup>Paleoanthropology and Paleoenvironment Program and Department of Zoological Sciences, College of Natural Sciences, Addis Ababa University, PO Box 1176, Addis Ababa, Ethiopia. E-mail: [solyirga@yahoo.com](mailto:solyirga@yahoo.com)

**ABSTRACT:** A study to investigate the diversity of the mammalian fauna of the Mazie National Park (MNP) was carried out from October 2007 to March 2008. Based on topographic maps, and a preliminary survey, four habitat types (riverine forest, grassland with scattered trees, savannah grassland, and bush land) were identified. Mammals were recorded in representative samples of each vegetation type in the park. A total of 39 mammalian species were recorded in MNP. Of these, 30 were medium to large-sized mammals, 6 were small rodents and 3 were shrews. The observed mammals of the study area were grouped into eight categories based on their feeding habits as meat eaters (23%), fruit and leaf eaters (8%), termite specialists (3%), root eaters (8%), grazers and browsers (10%), small gleaners (13%), bulk feeders (3%) and others (32%).

**Key words / phrases:** - Diversity, mammals, Mazie National Park**INTRODUCTION**

Vaughan *et al.* (2000) indicated that the distribution of mammals occurs in two levels, namely, the geographic distribution of species and the local distribution of individuals. Home ranges, territories, and microhabitats are indicators of the distribution of individuals within an area of convenient habitats (Smith, 1992). These are governed by access to important resources such as food, living space and availability of mates.

Information on diversity and abundance of mammals is central to understanding ecological processes including population dynamics, demography, and the community structure of mammals (O'Connell, 1989). Such information has significance in conservation that it can pinpoint areas of high diversity of mammals and help managers understand effects of habitat fragmentation, loss of top predators and exploitation of mammalian fauna for the welfare of human kind (O'Connell, 1989).

Ethiopia is one of the endemism centres of the world owing to its geographic position and topography characterized by high mountains and

deep valleys. The Ethiopian rift valley crosses the country from southwest to northeast and most of the western and eastern parts of the country consist of low lands. As a result, Ethiopia is also home to many mammalian species indigenous to African savannahs. The present study is about the mammalian diversity of a relatively new conservation area in Southern Nations, Nationalities, and Peoples Regional State, the Mazie National Park.

**THE STUDY AREA**

The study area, Mazie National Park, is located about 210 km south west of Hawassa town and 440 km south of Addis Ababa. It lies between 6.28°–6.48°N and 37.17°–37.3°E. It is found in Gamo Gofa administrative zone of the Southern Nations, Nationalities and Peoples Regional State (SNNPR) (Fig. 1). The altitude rises from 930 masl on the lower part of the Mazie River to over 2000 masl at the peaks of mountains surrounding the area.

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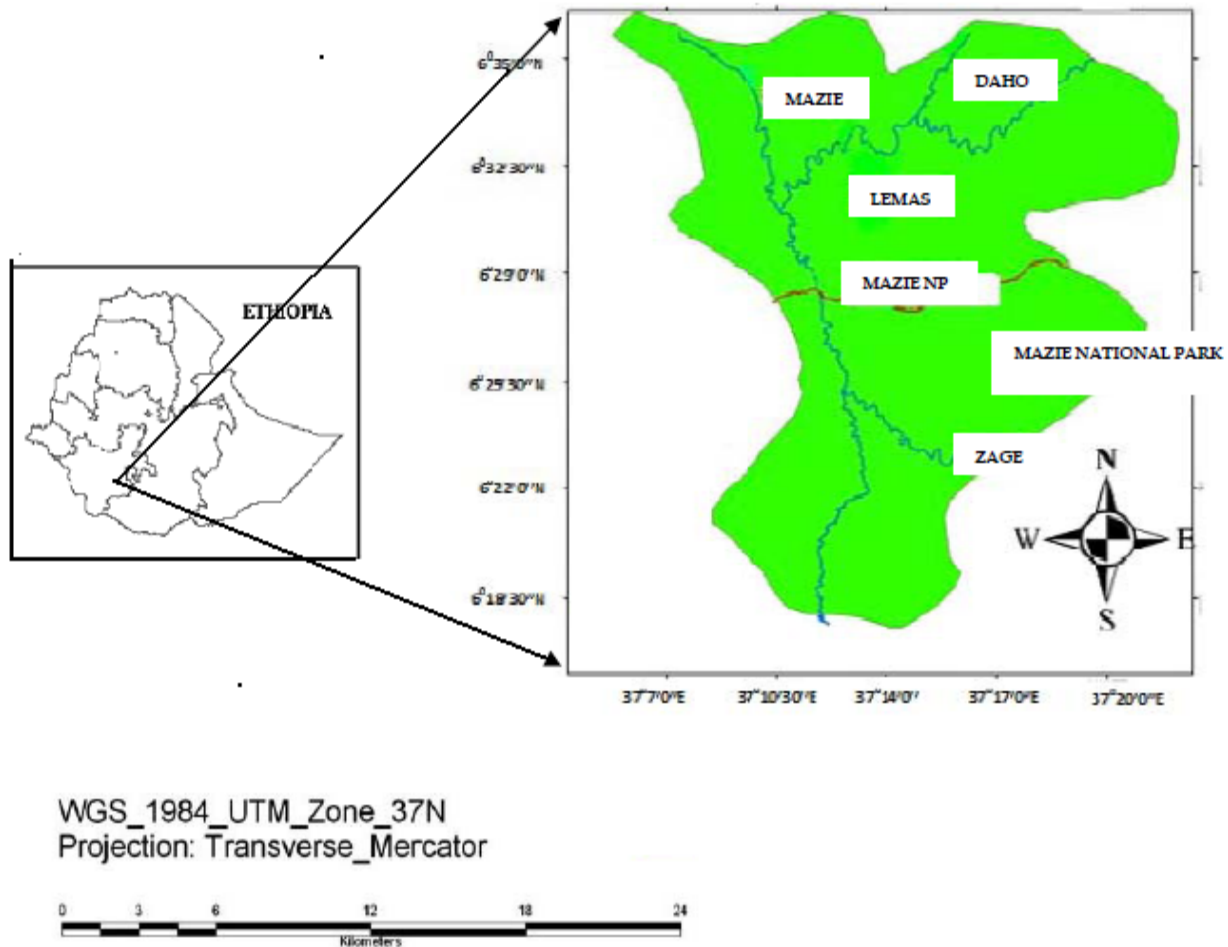


Figure 1. Location map of the study area (Source: - Actual field survey and GIS Work (Gebreyohannes Abrha, 2008))

## METHODS

### *Small mammals trapping methods*

In a preliminary survey, the park was divided into four census zones based on the vegetation cover. Riverine forest, grassland with scattered trees, savannah grassland, and bush land were identified.

One up to three randomly selected transects depending upon visibility were established along each census zone to capture small mammals. The length of line transects varied from 300 m to 345 m. To capture small mammals, Sherman live-traps of two different sizes (13 x 13 x 38 cm and 7.5 x 9 x 22 cm), were set in the different habitat types. Each line had 20 to 23 Sherman live-traps. Traps were placed at equal intervals of 15 m apart along each transect line and were set for 3 consecutive days in each census zone so as to cover the different vegetation zones, and also to

cover as much area as possible in each census zone. Trapping was conducted from October 5, 2007 to November 5, 2007 during the first data collection period and from February 15, 2008 to March 15, 2008 during the second data collection period. Total trap nights utilized during the survey period were 1440.

Each trap was baited with peanut butter and white oats. Trapping at each site was preceded by a pre-baiting period to allow animals to familiarize with the traps. Traps were numbered before being set and covered with hay and other plants of the area as found, to avoid excess heat during the day and to camouflage. This was also found important in preventing local people from being attracted by shiny and glittering objects from distance. Flagging tapes marked trap locations. Traps were checked twice a day, early in the morning (06:00–07:00 hr) and late in the afternoon (around 16:30–18:30 hr) to observe

and identify the nocturnal and diurnal small mammals respectively, and also to minimize mortality in the trap.

Standard morphometric measurements, such as head to body length (HB), tail length (TL), shoulder length (SL) and weight, were taken. The captured animals were weighed using spring balance, accurate to the nearest gram. Some catches were preserved in formalin and others were skinned and dried or released in case of redundancy.

Species identification was carried out using distinguishing characters (Kingdon, 1974; Yalden *et al.*, 1976). Specimens available at the Zoological Natural History Museum (ZNHM), Addis Ababa University, Ethiopia, were also used for accurate identification.

### *Large mammal survey methods*

The large mammals in this study area were surveyed using a vehicle, on the existing roads in the study area, as well as on foot along randomly selected line-transects. Two rounds of observation of large mammals were made between October 2007 and March 2008 in the study area.

Identification and recording of larger mammal species were made through direct observation with the naked eye and/or aided with binoculars and by indirect methods. Mammal identifications were based on field guide of Collins (1970) and Kingdon (1997). A total of five transects, each with varying length, were set in the study area. Transects of 4.5 to 12 km were walked in all study sites each day. Along the transects, any large mammal species observed, the number of animals seen and the GPS position were recorded. There was 1.06 km to 4 km distance between any two transects.

Three survey procedures were used to assess the large mammal community (Wilson *et al.*, 1996), namely, direct observation of animals, auditory identification of animal vocalizations, and searching for mammalian signs (Wemmer *et al.*, 1996). In the direct observations, animals were observed directly while walking along the transects. In mammal vocalization procedures, animals were identified through vocalizations heard. Signs of large mammals along the transects were sought. The signs included fresh tracks, faeces, lavatory stations, feeding, digging or territorial markings, animal parts, and other tangible evidences indicating that mammalian species were present. The majority of surveys were conducted on foot. Both direct and indirect

observation methods were employed during the foot surveys.

Survey of the large mammal species was done early in the morning during 06:00–11:00 hr and late in the afternoon from 16:00–18:30 hr, when most diurnal mammals were more active in the study area. Field identification of both diurnal mammalian species was based on visible morphological characters of each of the mammalian species such as body size, coloration, proportion and structure of various organs like tail, and ears. Animal signs such as faeces, footprints, and parts of the animals were used for the nocturnal animals. To have clear pictures of each mammalian species, observer noises were minimized and to avoid being smelled by the animals, observation was made by moving against the direction of wind as far as possible.

During vehicle monitoring, when an animal was sighted, the vehicle was stopped and the species, group size, time, location and habitat type along with the location were recorded. These measures were also taken for each encounter on foot survey.

## RESULTS

A total of thirty nine (39) species of mammals were identified and recorded in the MNP during the present investigation. The mammalian species recorded belong to seven orders, fifteen families and thirty two genera. The order Artiodactyla was represented by the highest number of species (13 species) followed by Carnivora and Rodentia (nine species each), and Primates and Insectivora (three species each). The orders Duplicitentata and Tubulidentata were represented by one species each.

Among the mammalian species identified in the present study, 24 species (62%) were sighted directly during the study period, four species (10%) were based only on indirect evidences, 11 species (28%) were both sighted directly and based on indirect evidences. Of the total mammalian diversity recorded to occur in MNP, 13 species (33%) are common, 12 species (31%) are uncommon, 3 species (8%) are rare, and 11 species (28%) are occasional in their occurrence.

The distribution of small mammals in the present study area varied from habitat to habitat. Among the four different habitat types of the study area, the grassland with scattered tree and bush land habitats had the largest number of

different species recorded. This might be due to availability of food and shelter.

*Lemniscomys striatus* was the most common and widely spread in all habitat types of the study area. Following *L. striatus*, *Mastomys natalensis* was seen more frequently or abundantly in the study area. Only *Lemniscomys striatus* and *Mastomys natalensis* were common to all the habitat types of the study area. *Crocidura flavescens* was found to be the least captured small mammalian species (Table 1).

As far as the large mammals are concerned, the study area supports the most conspicuous animals including the critically endangered subspecies Swayne's hartebeest. The most commonly observed large mammals are Oribi and Bohor

reedbuck. The riverine and grassland with scattered tree habitats are rich in varieties of fauna, such as buffalos, greater and lesser kudu, bush pig, oribis, warthog, bohor reedbuck, bushbuck, waterbuck, olive babbon, colobus and vervet monkey, and different carnivores such as lion, hyaena, leopard, common jackal, and white-tailed mongoose.

The Shannon-Weaver diversity indices ( $H'$ ) for large mammals were 2.313, 2.195, 2.099, and 1.986 for riverine forest, grassland with scattered tree, savannah grassland, and bush land habitats, respectively. The diversity results show that the greatest large mammalian species diversity was located within the riverine forest and grassland with scattered trees habitats, with the lowest diversity being recorded in bush land habitat.

**Table 1. Distribution of mammals and numbers of individuals observed during monitoring in the different habitat types of the study area. (RF=Riverine Forest; BL=Bush Land; GST= Grass land with scattered tree and SGL=Savannah Grass Land).**

NO	Common names	Methods of Identification	Habitat Types			
			RF	BL	GST	SGL
1	Warthog	Visual/faeces	–	16	20	3
2	Oribi	Visual/kp/kca	12	20	60	8
3	Swayne's Hartebeest	Visual/faeces /kp	–	27	45	4
4	Greater Kudu	Visual/horn	3	19	28	–
5	Lesser Kudu	Visual	–	2	6	–
6	Lion	Visual/faeces/sound	3	3	2	2
7	Stripped hyena	Faeces/sound	–	–	–	–
8	Spotted hyena	Faeces/sound	–	–	–	–
9	Leopard	Footprint/visual	1	–	–	–
10	African Buffalo	Footprint/horn	–	–	–	–
11	Vervet monkey	Visual	3	–	–	–
12	Guereza	Visual/vocal	12	–	–	–
13	Klipspringer	Visual	–	–	3	–
14	Olive Babbon	Visual/vocal	34	18	26	–
15	Common water buck	Visual	6	–	14	–
16	Bohor Redbuck	Visual	3	17	23	5
17	Common bush buck	Visual	7	12	6	2
18	Common Jackal	Visual	–	–	1	–
19	Bush pig	Visual/Footprint/digging/kh	3	–	–	–
20	Guenther's dik dik	Faeces/visual	–	8	2	–
21	White tailed Mongoose	Visual	1	–	–	–
22	Abyssinian genet	Visual	–	–	1	–
23	African Civet	Visual	3	–	–	1
24	Cane Rat	Visual	6	–	–	–
25	Crested Porcupine	Visual/Digging/spine	3	5	2	1
26	Aardvark	Digging	–	–	–	–
27	African Rabbit	Visual	–	–	1	–
28	Striped Ground Squirrel	Visual	–	–	1	–
29	Giant Forest Hog	Visual	2	–	–	–
30	Serval cat	Visual	1	–	–	–
31	Zebra mouse	trap	5	30	16	3
32	Mus' rat	trap	–	1	–	4
33	Mus	trap	–	–	–	9
34	<i>Crocidura fumosa</i> (shrew)	trap	–	–	4	5
35	<i>Crocidura bildegradeae</i> (shrew)	trap	2	2	–	2
36	<i>Crocidura flavescens</i> (shrew)	trap	4	–	–	–
37	Grass rat	trap	–	20	24	–
38	Multimammate mouse	trap	10	16	8	13
39	Somali grass rat	trap	21	72	54	33

The Simpson's similarity index (SI) for small mammals indicated that the similarity of species composition for small mammals among the four habitats of the study area was 0.381 (38.1%). This indicates that less than half of the captured small mammal species types in the present study are common among the different habitats of the study area. The Simpson's Similarity Index (SI) for large mammals indicated that the similarity of species composition for large mammals among the four habitats of the study area was 0.387 (38.7%). This indicates that only 38.7% of the recorded large mammals of the study area were common to all habitats of the study area.

The mammals of Mazie National Park were also categorized as common (fairly well distributed and sighted and/or evidence recorded once a day), uncommon (fairly well distributed and sighted and/or evidence recorded once a week), occasional (restricted distribution and sighted and/or evidence recorded infrequently), and rare (very few evidences recorded and/or single sight recorded during the whole survey periods) (Wemmer *et al.*, 1996).

## DISCUSSION

The abundance and distribution of rodents depend mainly on the nature and density of vegetation for food and shelter (Happold, 1974). Rodent density in any area correlates with the availability of food (Cole and Batzli, 1979). Consequently, rodent species' distribution patterns are not random (Hagmeir and Stults, 1964), and follow geographic patterns (Krytufek and Griffiths, 2002; Azied Osman, 2007). In addition to this, many more environmental factors have the same effect on the time of reproduction in rodents. Among these, temperature and nutrition are the most important factors (Vaughan *et al.*, 2000).

In the present study, the distribution of small mammals observed belong to two orders (Rodentia and Insectivora). In these taxa, five families, namely, Soricidae, Muridae, Thryonomyidae, Hystricidae, and Sciuridae are represented. According to Yalden *et al.* (1976), *Lemniscomys striatus* species seems to be most characteristic of grassy glades in open woodland. That is why it was captured mostly from the grassland with scattered tree habitat of the study area. Next to grassland with scattered tree

habitat, it was harvested mostly from the savannah grassland habitat. Further, according to Yalden *et al.* (1976), *L. striatus* feeds on grass stems and leaves. It also feeds on seeds, cultivated crops and at times, it may eat insects. That is one reason why this species was captured from all habitat types of the study area since grass stems and leaves were more abundant in grassland with scattered tree and savannah grassland habitats. Seeds were mostly abundant in and around the riverine forests and sometimes in bush land habitats. The finding of this study is comparable to that of Yalden *et al.* (1976) concerning the distribution of *L. striatus*. In general, *L. striatus* was found to be more abundant in grassland with scattered tree habitat than other habitats of the study area. This is because in addition to the abundance of grass, leaves, seeds, stems, insects, and due to some cultivation practices in some parts of the grassland with scattered tree habitat. Moreover, the scattered trees provide good protection from predators.

*Arvicanthis dembeensis* feeds mainly on leaves, seeds and shoots of grasses (Yalden *et al.*, 1976). The present study also revealed that *A. dembeensis* inhabits only in the grassland with scattered tree and savannah grassland habitats. This species occurred due to the feeding preference and the availability of food sources. It was the third most frequently seen species in the study area next to *L. striatus* and *Mastomys natalensis*.

*Arvicanthis somalicus* feeds mainly on seeds, leaves, and shoots of grasses (Yalden *et al.*, 1976). This is also revealed in the findings of the present study as the results show that *A. somalicus* was found only in the grassland with scattered tree and savannah grassland habitats of the study area. Therefore, its occurrence in the grassland with scattered tree and savannah grassland habitats is expected. Among the small mammal species identified in the study area, *A. somalicus* was the least observed next to *Crocidura flavescence*.

*Mastomys natalensis* has been recorded in Ethiopia fat altitudes ranging from 500 to 2900 masl. At lower altitudes, it is not noticeably a dry country form but tends to be associated with river valleys and lake sides, where it is often an inhabitant of cultivated land (Yalden *et al.*, 1976). During the present study, this species was seen in riverine forest habitat and grassland with scattered tree habitat where there were cultivated lands. Its occurrence in these habitats was

expected. This species was widely distributed in all habitat types of the study area and is the second most frequently observed species next to *L. striatus* (Table 1).

According to Yalden (1988a; b), *Mus mahomet* is found in grassy patches, bushes and open habitats. Therefore, its occurrence in bush land and grassland with scattered tree habitats was expected.

Distribution and habitat association of mammals are determined mainly by their water and food requirements in the MNP. The highest large mammalian species diversity in the riverine forest and grassland with scattered trees habitats in this study indicates the importance of water for survival as these habitats are located near the Mazie, Domba, and Lemasie rivers (Fig. 1), particularly the riverine habitat. Cover is also important because mammals, especially large mammals, are dependent on food sources as well as protection (Bailey, 1984).

Water and pasture conditions or the combinations of both are the major factors determining the distribution of wildlife populations in their natural habitats (Balakrishnan and Essa, 1986). According to Afolayan and Ajayi (1980), water, food, cover, mineral requirements and burning practice are found to be the main factors influencing the movements and distribution of wild animals especially during the dry season. In the present study, these were revealed with respect to the distribution of mammals. Moreover, poaching was a major factor concerning their distribution in the study area. The distribution of mammals revealed that the mammalian fauna is not uniform across the four main types of habitats in the study area. Only oribis, common bushbuck, Bohor reedbuck, and aardvark were common in the different major vegetation types in the MNP.

The results of faunal composition in different vegetation types of the study area indicated that the grassland with scattered tree habitat has the highest number of large mammalian species (21). This is followed by riverine forest habitat having nineteen (19) large mammalian species, bush land with fourteen (14) large mammalian species, and savannah grassland with nine (9) large mammalian species. The main reason for the presence of such large number of mammalian species in the grassland with scattered trees habitat is probably the availability of food and water for most of the species. Moreover, it also

has relatively minimal security problems like poaching, burning of fire as compared to the other habitats. Next to the grassland with scattered trees habitat, riverine forest habitat harbours relatively large number of mammalian species. This might be related to the habitat complexity and stability. Moreover, most parts of the riverine forest habitats were located around the center of the MNP and relatively far from human settlements. Thus, human impact was minimal in this area.

The distribution of mammals in the different habitat types of the area might indicate habitat selection of the different species of mammals based on their ecological preferences as well as evolutionary adaptation (Bailey, 1984). During the present study, the near similarity in the distribution of mammals in the riverine forest and grassland with scattered tree habitats is due to the near similarity of the two habitats in the possession of food, cover and other resources to meet their requirements.

Differences in feeding habits also enhance diversity, richness and evenness (Smith, 1992). The availability of different food types in different habitats contributed to the diversity of mammals in MNP. Moreover, other factors, including weather patterns, might also contribute to the selection of appropriate habitat depending on the physical and behavioural traits of the species (Vaughan *et al.*, 2000). Regarding the recordings, signs of some species are more likely to be recorded than the signs of other species. For example, warthog, hartebeests, and Guenther's dik dik droppings and footprints, as well as calls of olive baboon and colobus guereza, are more obvious than many other species, and bias their abundancy.

With the number of mammalian species it harbors, as well as its beautiful nature and avifauna, the potential of the Mazie National Park to become a great tourist destination is very high, provided, poaching is halted and the human interference is checked.

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