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Full Length Research Paper

Evaluation of roan antelope habitats (*Hippotragus equinus*, desmarest 1804) in Kainji lake national park, Nigeria

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The habitat types of Roan Antelope in Kainji Lake National Park were evaluated in 2007 to determine its plant species composition, distribution and structure in terms of diameter at breast height (DBH). The total count method and step point line techniques (SPLT) were used in the survey. There were 35 woody plants species in the Roan habitats. The six habitats were identified as*; Afzelia africana*(A), *Burkea – Detarium* (B), *Terminalia* (C*)*, Oli river complex (D), *Isoberlinia* (E) and Riparian Forest (F). The following plant species occurred in all the habitats recorded; *Combretum* spp., *Detarium microcarpum*, *Grewia mollis*, *Gardenia spp.*, *Terminalia* spp. and *Vitellaria paradoxa*. The result on structure revealed that DBH class of 1.0-20.0cm had the highest percentage of 42 and least percentage of 1.0 in DBH classes of 60.1-80.0cm in the *Afzelia africana* habitat. The *Burkea – Detarium* habitat had 54% in the 20.1- 40.0cm DBH classes. The *Terminalia* habitat had 28% in DBH class of 20.1-40.0cm. The Oli river complex had 30% in the 20.1- 40cm DBH class. The *Isoberlinia* habitat had 24.0% each in the 1.0–20.0cm and 40.1-60.0cm DBH classes. The Riparian Forest recorded 35.5% in the 80.1-100cm DBH class. In the grass/forbs plant species, thirty-two plant species were recorded. Only *Andropogon gayanus* occurred in six habitats of Roan Antelope. The ability to occur in at least three habitats recorded *Loudetia bractolats*.

Keywords: Evaluation, Roan antelope, Habitat, Park

INTRODUCTION

Vegetation make up the habitat of wild animal species without which animals will go extinct and it provides food, cover and escape cover for the wild animals species (Tyowua *et al.,* 2005).The field studies that wildlife researchers make of animals are greatly enhanced when observations are related to the type of habitat in which the animals occur. This is because both its distribution, behavior and the continued abundance of an animal species is directly dependent on the extent that habitat requirements of that species are met. It is consequently essential in any large mammal study to be aware of the habitat of the animals living within and depending upon it (Riney, 1982).Habitat quality and quantity have been identified as the primary limiting factors that influence animal population dynamics (Jansen *et al* ., 2001).Habitat influences the presence, abundance, distribution, movement and behavior of game animals (Musila *et al*., 2001).Maintaining high quality habitats and ensuring the long-term ecological integrity is therefore increasingly becoming an important management challenge and establishment of wildlife protected areas have been

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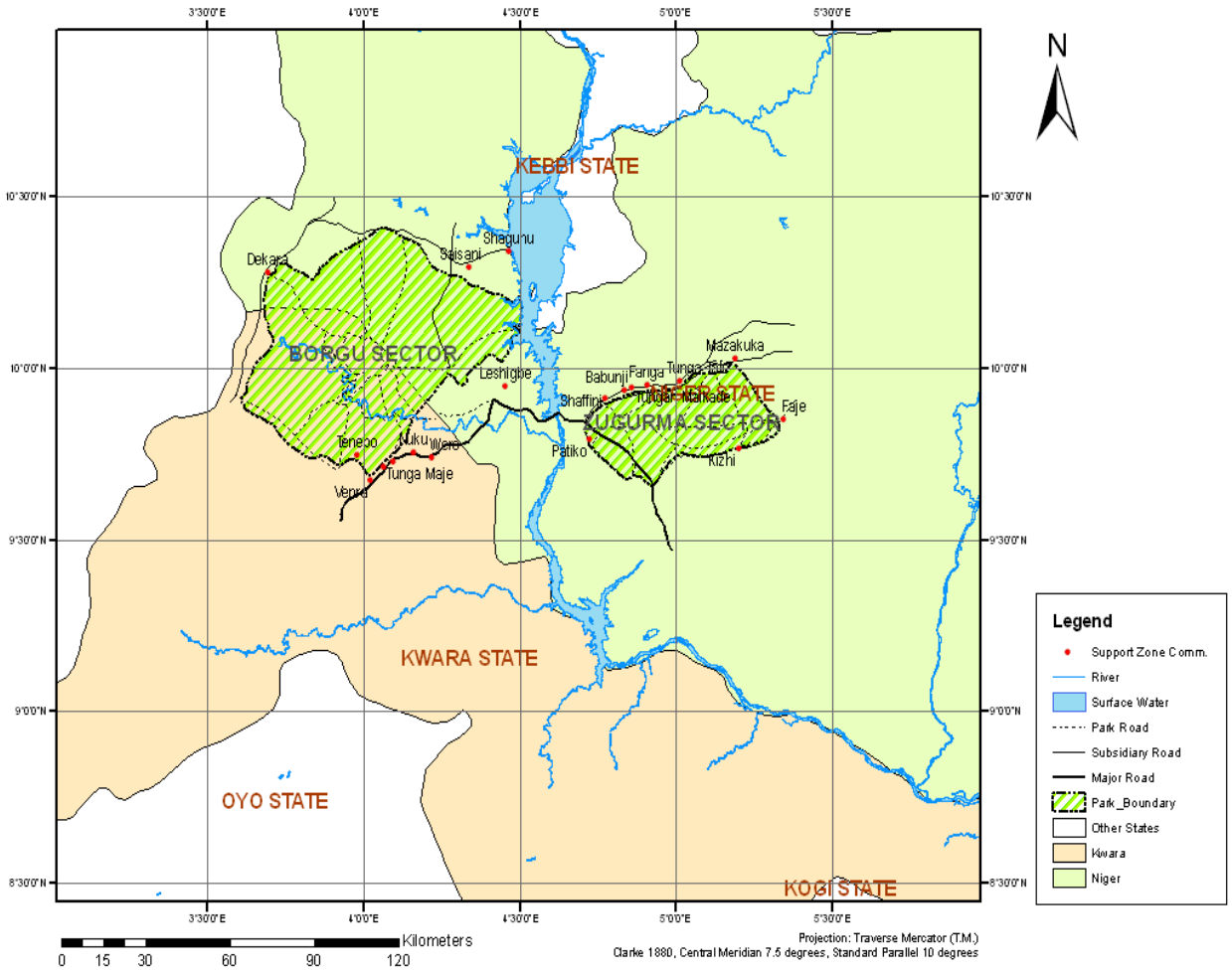

Figure 1. Map of Kainji Lake National Park showing Borgu and Zugurma Sectors.
Source: Tuna (1992)

adopted as the most feasible strategy to this end (Chap *et al.*,2005).The need to plan natural resources management on the basis of accurate inventory and take protective measures to ensure that the resources do not become exhausted are the concept of modern conservation. The objectives of the study were to evaluate the habitat types of Roan antelope to determine its plants species composition, distribution and structure in terms of diameter at breast height (DBH) in Kainji Lake National Park.

MATERIALS AND METHODS

Study Area

The study was conducted in Borgu sector of Kainji Lake National Park covering an area of 3970.02 km2. The park is located at the boundary between the Sudan and the Northern Guinea Savanna (Keay, 1959) and lies between latitude 90 40''and 9^0 23''N and longitude 3^0 40'' and 5^0 47''E (Figure 1).The Major vegetation types of the park includes: *Burkea africana – Detarium microcarpum* wooded savanna, *Isoberlinia tomentosa* woodland, *Diospyros mespiliformis* dry forest, *Terminalia macroptera* tree savanna, *Isoberlinia savanna* woodland, Riparian forest woodland and Oli river complex. The two major features of the climate of the park are the division into wet and dry seasons and the variability from year to year. The wet season extends from May to October. The mean annual rainfall varies from 1,100mm in the eastern part to 1,150mm in the West part. The lowest temperature of the park about 12^0c occurs between December and January. The highest mean maximum temperature occurs during months of February, March and April and is about 35^0c (Afolayan, 1978).

The park contains most of the animal species of typical Guinea savanna zone. Some of the animals and avifauna found in the study area include: Roan antelope (*Hippotragus equinus*), Western hartebeest (*Alcelaphus baselaphus*), Oribi(*Ourebia ourebi*),Grey duiker (*Sylvicapra grimmia*) and Patas monkey (*Erythrocebus*

Table.1 Woody plants species composition in Roan Antelope Habitat in Kainji lake national park:

Sno	Species name	Habitat Type A	B	C	D	E	F
1.	*Afzelia africana*	+	+	-	-	-	-
2.	*Acacia spp.*	+	+	-	+	-	+
3.	*Annona senegalensis*	-	+	+	+	-	+
4.	*Anogeissus leiocarpus*	-	-	+	+	-	+
5.	*Burkea africana*	+	+	-	+	+	+
6.	*Bridelia ferruginea*	-	-	+	+	-	+
7.	*Combretum spp.*	+	+	+	+	+	+
8.	*Crossopteryx febrifuga*	-	+	-	-	-	+
9.	*Cochlospermum tinctorium*	-	+	-	+	+	+
10.	*Detarium microcarpum*	+	+	+	+	+	+
11.	*Daniella oliveri*	+	-	+	+	-	-
12.	*Diospyros mespiliformis*	-	-	-	+	+	-
13.	*Entanda africana*	+	-	-	-	-	-
14.	*Grewia mollis*	+	+	+	+	+	+
15.	*Gardenia spp*	+	+	+	+	+	+
16.	*Hymenocardia acida*	+	-	-	-	+	+
17.	*Isoberlinia doka*	+	-	-	+	+	-
18.	*Khaya senegalensis*	-	-	-	+	-	-
19.	*Kigelia africana*	+	-	+	+	+	+
20.	*Lannea acida*	+	-	+	+	+	+
21.	*Monotes kerstingii*	+	-	-	+	+	+
22.	*Maytenus senegalensis*	+	-	+	+	+	+
23.	*Mauclea latifolia*	+	-	+	-	+	-
24.	*Prosopis africana*	+	+	+	-	-	+
25.	*Pterocarpus erinaceous*	+	+	-	-	+	-
26.	*Piliostigma thonningii*	-	+	+	+	-	+
27.	*Parinari polyandry*	-	+	-	-	-	-
28.	*Strychnos spinosa*	+	-	-	-	-	+
29.	*Sterculia setigera*	-	-	+	-	+	-
30.	*Stereospermum kunthianum*	-	+	-	-	+	+
31.	*Terminalia spp.*	+	+	+	+	+	+
32.	*Tamarindus indica*	-	-	+	-	-	-
33.	*Vitellaria paradoxa*	+	+	+	+	+	+
34.	*Vitex doniana*	+	-	-	+	-	-
35.	*Ximenia americana*	-	-	+	+	+	+

KEY. A = *Afzelia africana* B = *Burkea/Detarium* C = *Terminalia* woodland D = *Oli River* Complex
E = *Isoberlinia* woodland F= Riparian Forest +=Present -=Absent

patas). Species that are associated with perennial water points includes; Water buck (*Kobus defassa*), Kob (*Adenota kob*), Reedbuck (*Redunca redunca*), and Green Monkey (*Cercopithecus aethiops*). The red flanked duiker (*Cephalophus rufilatus* is associated with the the fringing forests along the rivers. Hippopotamus (*Hippotragus amphibus*) occurs in the river Oli and it has been said that Manatee (*Trichechus senegalensis*) occurs in Kainji Lake. Other species present include the Lion (*Panthera pardus*), Warthog (*Phacochoerus aethiopicus*), Buffalo (*Syncerus caffer*) as reported by Milligan (1979) and Ayeni (2006).

Methods

A reconnaissance survey was carried in April 2007 to identify the areas of Roan Antelope activity. In each of the habitat types recognized in which Roan Antelope were sighted, three (10m x 10m) plots were laid. Total enumeration of woody plants above a meter in height were carried out taking records of plant species composition and measuring the diameter at breast height (dbh) using measuring tape Similarly in each of the 10m x 10m plot, two transects were laid at 4m interval, 3 samples were collected on each transect using step point line techniques (Riney, 1982). Eighteen samples were collected in each habitat and the totals of 108 samples were collected for the six habitat types. The exercise was done in June and July 2007 using twenty days.

Data analysis

Data collected were pooled together and analyzed using simple descriptive statistics; percentages and presented in Tables.

RESULTS

The result on Woody plants species were presented in Table 1. The totals of Thirty-Five woody species were recorded across the six habitat types. The occurrence of

Table 2. Diameter at Breast Height (DBH) percentage distribution of woody plants species in Roan antelope Habitat types in Kainji lake national park,

DBH Classes	Habitat Type					
	A	B	C	D	E	F
1-20.0	42.0	22.0	22.0	26.0	24.0	7.5
20.1-40	20.0	54.0	28.0	30.0	23.0	7.5
40.1-60	15.0	13.0	16.0	17.0	24.0	15.0
60.1-80	1.0	2.0	10.0	20.0	5.0	10.0
80.1 100	3.0	3.0	9.0	1.0	3.0	32.5
>100	19.0	6.0	15.0	6.0	21.0	27.5
Total	**100**	**100**	**100**	**100**	**100**	**100**

A = *Afzelia africana*, B = *Burkea/Detarium*, C = *Terminalia* woodland, D = *Oli River* Complex
E = *Isoberlinia* woodland, F = *Riparian Forest*

Table 3: Grass/Forbs species plants in Roan Antelope Habitat Types in Kainji lake National Park:

S N0.	Species	Habitat Type					
		A	B	C	D	E	F
1.	*Acacia polyacantha*	-	-	-	-	-	-
2.	*Andropogon gayanus*	-	+	-	-	+	-
3.	*Andropogon tectorum*	-	-	-	-	+	-
4.	*Andropogon pseudapricus*	-	-	+	-	-	-
5.	*Aristida kerstingii*	-	+				
6.	*Brachiaria jubata*		+	+			
7.	*Brachiaria brachylopha*	-	-	-	-	-	+
8.	*Beckeropsis uniseta*	-	-	-	-	-	-
9.	*Cenuana pratensis*	-	-	-	+	-	-
10.	*Chchlospermum tinctorum*	-	+	-	-	-	-
11.	*Chloris robusta*	-	-	-	+	-	-
12.	*Cymbopagon giganteus*					+	
13.	*Eragrostis berteri*	-	-	-	+	-	-
14.	*Elionuris spp.*	-	+	-	-	+	-
15.	*Heliotropium indicum*	-	-	-	+	-	-
16.	*Hyparrhenia involucrate*	-	+	-	-	-	-
17.	*Hyparrhenia subplumosa*		+				
18.	*H. smithiana*		+				
19.	*H.rufa*			+			-
20	*H.glabriuscula*	-	-	+	-	-	-
21.	*H. cyanescens*	-	-	+	-	-	-
22.	*Hyperthelia dissolute*		+				-
23.	*Indigofera bracteolats*	-	+	-	-	-	-
24.	*Loudetia annua*	-					
25.	*L. flavida*	-	+	-	-	+	-
26.	*Mimosa pigera*						-
27.	*Monocymbium ceresiiforme*	-	-	-	-	+	-
28.	*Paspalum orbiculare*	-	-	-	+	-	-
29.	*Panicum paucinode*			+			
30.	*Schizachyrium sanguineum*					+	
31.	*Sporobolus festivus*	-	+				
32.	*Stachytarpheta angustifolia*	-	-	-	+	-	-

KEY. A = *Afzelia africana*, B = *Burkea Detarium*, C = *Terminalia* woodland, D = *Oli River* Complex. E = *Isoberlinia* woodland. F = *Riparian Forest*. + = Present - = Absent

a species in all the habitat types recorded; *Combretum* spp. *Detarium microcarpum*, *Grewia mollis*, *Gardenia* spp., *Terminalia* spp., and *Vitellaria paradoxa.* The following species; *Burkea africana, Kigelia africana, Lannea acida* and *Maytenus senegalensis* occurred in five habitat types. The occurrence of a species in four

habitat types had; *Acacia* spp., *Anona senegalensis*, *Piliostigma thonningii* and *Ximenia americana*.The occurrence of species in at least three habitat types recorded; *Anogeissus leiocarpus,Bridelia ferruginea* and *Daniella oliveri, Hymenocardia acida*, *Isoberlinia doka, Nauclea latifolia, Pterocarpus erinaceous, Stereopermum kunthianum*. in two or one habitat types.The diameter at breast height (dbh) distribution of woody plants presented in Table 2. Six DBH classes were presented with distribution of woody plants across. The dbh class of 1-20.0cm recorded highest value of 42.0% and least value of 1.0% in the The rest of the species occurred Afzelia africana woodland habitat. The Burkea/Detarium woodland recorded highest value of 54.0% in the 20.1-40.0cm dbh class. The Terminalia woodland recorded value of 28.0% in dbh class of 20.1- 40.0cm. The Oli river complex had 30.0% in the 20.1 – 40.0cm dbh class.The Isoberlinia woodland recorded 24.0% in both 1.0-20.0cm and 40.1-60.0cm dbh classes. This was followed by 23.0% in the 20.1-40.0cm dbh class. The Riparian Forest had 32.5% in the 80.1-100 dbh class, followed by 27.5% in the >100cm dbh. The total of thirty two grass/forb species occurred in the study (Table 3). The occurrence of plant species in four habitat types recorded; *Andropogon gayanus*. While the occurrence of plant species in three habitat types had; *Loudetia bractolats*.The rest of the species occurred in either two or one habitat types.

DISCUSSION

The plant species composition and distribution of the habitat types of Roan antelope were the same as that in the Guinea Savanna Vegetation Zone in West Africa. It was observed that some of the species were becoming rare due to changes in habitat cover. The ability of plant species to occur in all the habitat types was an indication of good status in terms of stability. The following plant species were stable; *Combretum* spp., *Detarium microcarpum*, *Grewia mollis, Gardenia* spp., *Terminalia spp*., and *Vitellaria paradoxa.* While *Crossopteryx febrifuga, Parinari polyandra, Termarindus indica*, *Khaya senegalensis* and *Entada africana* were unstable and threatened as a result of indiscriminate late burning in the habitat as observed during the study. According to Afolayan and Agbelusi (1995), Man's interference with woodlands through indiscriminate use of fire is one of the reasons why some species were finding it difficult to strive. The grass species relevant were gradually being replaced by noxious species hence only *Andropogon spp*. seemed to be striving to survive in terms of distribution. The result on diameter at breast height showed clearly the Riparian forest having woody plants in bigger dbh classes while the other habitat types had most of their woody plants in the lower dbh classes. The presence of plant species in each dbh classes is an indication of stability for such species. Hence the protection of the area could be a good reason for this observation. Sanford *et al*., (1982) reported of the consistent linear relationship in mature Guinea Savanna between the natural Logarithm of dbh class and percentage of stem in each class.

CONCLUSION

The study concludes that the habitat types of Roan Antelope had thirty five woody plants species while grass/forbs plants species had thirty-two species. In terms of dbh, the Riparian habitat had highest percentage of 32.5 in 80.1-100cm classes, while *Burkea /Detarium* had highest percentage of 54.0 in dbh classes, of 20.1-40.0cm.

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