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Evaluation of Kob (*kobus kob*, Erxleben) habitat in Kainji Lake National Park, Nigeria

Meduna, A. J., Oyeleke, O.O. *Amusa, T.O., Likita, I.B., Ajayi, S.R., Akor, S. and Patrick, V.

Federal College of Wildlife Management,
Forestry Research Institute of Nigeria,
P.M.B.268, NewBussa, Niger State, Nigeria.

*Corresponding Author-mail: teejayui@yahoo.com

ABSTRACT

The study assessed the floristic composition and structure of *Kobus kob* habitat in the Borgu sector of Kainji Lake National Park with a view to enhancing the management of the species in its natural environment. With the aid of a reconnaissance survey and habitat mapping, the study area was stratified into two viz; Oli complex and Woodland complex. A total of eight 20m x 200m plots (3.2ha) were set up, using simple random sampling technique in both habitats. To gain a basic understanding of the structural state of the habitats, a rank scale was used to describe densities of parameters measured. Results revealed that the Oli complex is characterized by dense canopy cover with sparse under ground cover, lianas and a moderate occurrence of epiphytes. In contrast, the woodland complex is characterized by moderate occurrence of ground cover with sparse canopy cover from woody plants, while lianas and epiphytes are very scanty. Significant difference ($F= 0.01$; $df= 7$; $P< 0.05$) was observed in habitat variables between the Oli complex and woodland complex. Effective distribution of the kob in relation to habitat structure and composition would be a primary consideration in the management of the species. Developing existing water holes and creating more of these would be a way out in this regard.

Keywords: *Kobus kob*, water holes, habitat mapping, habitat structure and composition

INTRODUCTION

Kobus kob belongs to the family Bovidae in the order Artiodactyla. They occur in the moist savanna zones of Africa and are usually found near permanent water sources (Nowak, 1991). They have a short, reddish-brown coat, with a white throat – patch and white under parts. A distinctive black stripe marks the front of the forelegs (Stuart and Stuart, 1992). Only the males carry horns, with average length of 44cm and are ridged with transverse corrugations (Smith, 1985). Kobs usually have a lek mating system, in which males defend small territories clustered on traditional mating grounds (Deutsh, 1994). The females give birth to a single offspring after a gestation period of about nine months (Nowak, 1991).

Kobs are mostly active in the morning and evening hours. They form mixed – sex herds of females and young males (8 months) that may vary greatly in size over short time periods (Balmford, 1992), 8 to 124 kobs per square kilometer have been reported in suitable habitat (Muhlenberg and Roth, 1985). Kob eats grasses and reeds, and may migrate great distances to graze along water courses (Fryxell and Sinclair, 1988).

The kobs are commonly hunted for sport and food. A survey of bush meat preferences in Cameroon ranked kob as the third most favoured species, second only to North African porcupine and guinea fowl (Njiforti, 1996). Meester and Setzer (1971) reported that the range of the species (*Kobus kob*) is greatly diminished. In Nigeria, one of the strongest hold of the kob is Kainji Lake National Park. Within the Borgu Sector of the park, the kob is reported to have the highest mean density ($2.37/\text{km}^2 \pm 0.81$) (DRB, 2004). There is ample evidence to show that the population of the kobs has continued to increase over the years (Ajayi and Hall, 1975; DRB, 2004).

Nevertheless, while there is a burgeoning of the literature on the general ecology of *Kobus kob*, little attention is paid to vegetation study and analysis of habitat most favoured by the species within the park. This is of prime importance for effective management of kob habitat. In this study therefore, we investigate the floristic composition and structure of *Kobus kob* habitat in the Borgu Sector of Kainji Lake National Park.

METHODOLOGY

The Study area

The study area is Kainji Lake National park (KLNP). KLNP is the premier park in Nigeria covering a total area of 5340.82 km² and composed of two non-contiguous sectors, the Borgu and Zugurma sectors. The Borgu sector with an area of 3970.02 km² is situated in Borgu (Niger State), Kaiama and Baruten (Kwara State) Local Government Areas. The Zugurma sector, on the other hand, occupies an area of 1370.80 km² and situated in Mashegu Local Government Area of Niger State. The whole of the park lies between latitudes 9° 40' N and 10° 23' and longitudes 3° 30' and 5° 50' E (Tuna Wildlife Consultants and NARDES, 1983). The climate of the area is tropical with high temperatures, high relative humidity and distinct wet and dry seasons. The average monthly temperature is 34°C with a mean annual relative humidity of 60%. The mean annual rainfall value is 104.45mm (DRB, 2004). The vegetation of the Borgu sector is a transitional one between the Sudan and Northern Guinea Savanna types, while that of the Zugurma sector is typically Northern Guinea Savanna woodland (Child, 1974; Milligan, 1979; DRB, 2004). Interspersed with these variants are particles of riparian forest along the major water courses. The park harbours a variety of fauna and fishery resources.

Reconnaissance Survey and Mapping of *Kobus kob* Habitat:

A reconnaissance survey of the Borgu sector was first carried out in order to have a definite encounter with the species, and to map (Using the GPS – Global Positioning System) the specific habitat of the species within the park. Direct field observations of the animals were carried out using road counts method, while indirect methods were also employed for identification of species using droppings and foot prints. On the basis of the above, the study area was divided into two viz; Oli complex and woodland complex areas.

Vegetation Survey

In order to determine the structure and composition of *Kobus kob* habitat within the park, a total of eight 20m x 200m plots (3.2ha) were set up. Five of these were located in the woodland complex while the remaining three were conducted in the Oli complex. Within each of the plots, ten 10m x 10m subplots were carefully demarcated in order to evaluate the

floristic composition and structure of the habitat where the animals were found. We enumerated, identified and measured for height, diameter at breast height (dbh), crown diameter and crown height of all woody species encountered. Furthermore, within the strip of each 20m x 200m plots, an assessment of the proportion of soil surface covered by vegetation was carried out.

In order to gain a basic understanding of the structural state of the habitat, a rank scale was used to describe densities following Barnett, 1995.

Statistical Analysis

A one-way analysis of variance (ANOVA) was used to compare data on habitat variables between the Oli complex and the woodland complex. To avoid pseudo replication, we pooled data by site and used site as the replication (Underwood, 1997). A null hypothesis which states that; "there is no significant differences in habitat variables between the two complexes" was advanced for the study.

RESULTS

As revealed in Table 1 above, *Kobus kob* were frequently encountered in the Oli complex area of the park. Number of encounter with the animal via direct sighting is 256 with a mean density of 0.68± 0.1200 and average herd size of four (4). Within the complex, *Kobus kobs* were mostly sighted in a transition of fringing forest and bushland periphery.

With respect to the woodland complex, however, the occurrence of *Kobus kob* is scanty and were mostly seen moving singly. The result in Table 2 revealed that the Oli complex is characterized by dense canopy cover with sparse under ground cover, lianas and a moderate occurrence of epiphytes. In contrast, the woodland complex is characterized by moderate occurrence of ground cover with sparse canopy cover from woody plants. Lianas are very scanty in this area so also are epiphytes.

The above test (Table 3) is not significant (F= 0.01; df= 7; P< 0.05). The null hypothesis which states that; "there is no significant differences in habitat variables between the two complexes" is therefore rejected. This further confirms a significant difference in habitat variables between the Oli complex and woodland complex and offers explanation to the preponderance of kob in the Oli complex.

Table 1: Number of *Kobus kob* encountered in each complex as a function of habitat preference

Habitat	No encountered	Mean Density/Km ²	Average group size
Oli complex (375km ²)	256	0.68 ± 0.1200	4
Woodland complex (3549km ²)	23	0.0064 ± 0.0013	1

Table 2: Percentage (%) ranking of Habitat Variables within each complex

Habitat Variables	Woodland Complex				Oli Complex			
	0	1	2	3	0	1	2	3
Ground Cover	3	11	56	30	5	48	26	9
Canopy Cover	17	59	20	4	3	4	27	63
Presence of Lianas	90	7	2	1	18	42	29	11
Presence of Epiphytes	83	6	11	0	2	24	52	10

0 = Absent, 1 = Sparse, 2 = Moderate, 3 = Dense

Table 3: One-way Analysis of Variance for Differences in habitat variables between the two complexes (Oli and Woodland)

Source of Variation	SS	df	MS	F-cal	F-tab
Treatment (between columns)	60.97	7	8.710	0.01	2.42
Residual (within columns)	19150	24	798.1		
Total	19210	31			

DISCUSSION

From the foregoing, it is obvious that even though the Oli complex area of the park is smaller than the woodland complex, the kobs are mostly dominant in this part of the park. The implication of this is that, the riparian and adjacent woodland vegetation of this area can be over stressed by the species utilization of the habitat thereby impairing the carrying capacity and degradation of vegetation cover.

In the same vein, the result of habitat analysis revealed a wide variation between the woodland complex composition and structure and that of the Oli complex (see Table 1 and Appendix). This could be taken as evidence of habitat preferences and selection by the kob. That the kobs in Kainji Lake National Park are found near permanent water source (most especially area locally referred to as fadama), and at the margins of adjacent woodland is in tandem with the reports of Deutsch (1994) and similar to the observation of Aremu *et al.* (2001) on the ecology of water buck (*Kobus defassa*) in Old Oyo National Park, Nigeria.

To this extent, the distribution of the kob in relation to habitat structure and composition would be a

primary consideration in planning the development and management of the Oli complex.

CONCLUSION AND RECOMMENDATION

It is noteworthy that the Kainji Lake National Park Authorities have created kob court within the Oli complex with a view to enhancing herbage production for the kob. As the population of the animal increases, however, the need for effective spatial distribution of the species cannot be over-emphasized. Developing the existing water holes that spread through the park to retain water all the year round becomes of utmost necessity. This would also enhance fodder maximization in other part of the park. The animals themselves would be relieved of social stress and thus their rate of reproduction increased.

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Appendix: Species of Oli and Woodland complex

S/N	Species list	Oli Complex	Woodland Complex
1.	<i>Ficus sycomoros</i>	+	-
2.	<i>Diospyros mespiliformis</i>	+	+
3.	<i>Nauclea latifolia</i>	+	+
4.	<i>Irvingia smithii</i>	+	-
5.	<i>Khaya senegalensis</i>	+	+
6.	<i>Rotula aquatica</i>	+	-
7.	<i>Englarastrum gracithincum</i>	+	-
8.	<i>Vitex doniana</i>	+	-
9.	<i>Acacia siebriana</i>	+	+
10.	<i>Acacia polyacantha</i>	+	+
11.	<i>Acacia hockii</i>	-	+
12.	<i>Mimosa pigra</i>	+	-
13.	<i>Daniellia oliveri</i>	-	+
14.	<i>Combretum molle</i>	+	+
15.	<i>Anogeissus leiocarpus</i>	+	+
16.	<i>Terminalia macroptera</i>	+	+
17.	<i>Syzygium guineensis</i>	+	-
18.	<i>Mariscus alternifolius</i>	+	-
19.	<i>Jasminum obtusiflorum</i>	+	-
20.	<i>Pterocarpus erinaceus</i>	-	+
21.	<i>Parinari polyandra</i>	-	+
22.	<i>Lophira lanceolata</i>	+	+
23.	<i>Cochlospermum planchonii</i>	-	+
24.	<i>Cochlospermum tinctorium</i>	-	+
25.	<i>Annona senegalensis</i>	+	+
26.	<i>Bombax costatum</i>	+	+
27.	<i>Combretum nigerican</i>	+	+
28.	<i>Hymenocardia acida</i>	-	+
29.	<i>Sterculia setigera</i>	+	+
30.	<i>Bridelia ferruginea</i>	+	+
31.	<i>Boswellia dazielli</i>	-	+
32.	<i>Vitex crosocarpa</i>	+	+
33.	<i>Securinega virosa</i>	-	+
34.	<i>Vitellaria paradoxa</i>	+	+
35.	<i>Ximenia americana</i>	+	+
36.	<i>Maytenus senegalensis</i>	+	+
37.	<i>Strychnos spinosa</i>	+	+
38.	<i>Strychnos inoqua</i>	+	+
39.	<i>Gardenia aquala</i>	-	+
40.	<i>Crossopteryx febrifuga</i>	+	+
41.	<i>Pseudocedrella kotschii</i>	+	+
42.	<i>Lannea acida</i>	+	+
43.	<i>Securidaca longipedunculata</i>	+	+
44.	<i>Acacia gourmensis</i>	+	+
45.	<i>Prosopis africana</i>	-	+
46.	<i>Detarium microcarpum</i>	+	+
47.	<i>Burkea africana</i>	-	+
48.	<i>Tamarindus indica</i>	-	+
49.	<i>Isoberlinia doka</i>	+	+
50.	<i>Piliostigma thonningii</i>	+	+
51.	<i>Azelia africana</i>	-	+
52.	<i>Monotes kerstingii</i>	+	+
53.	<i>Stereospermum kunthianum</i>	+	+
54.	<i>Grewia molle</i>	+	+
55.	<i>Entada africana</i>	+	+
56.	<i>Lannea schimperi</i>	+	+
57.	<i>Pericopsis laxiflora</i>	+	+

NB: + implies presence

- implies absence