POPULATION STATUS OF OLIVE BABOON *Papio anubis* (LESSON, 1827) IN KAINJI LAKE NATIONAL PARK, NIGERIA

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ABSTRACT

The study assessed the population status of Olive Baboon Papio anubis in Kainji Lake National Park, in both sectors of the park. Direct count was carried out on the line transect where activities of Olive Baboon Papio anubis was observed during reconnaissance survey. It involves counting of individual or group of individual species sighted. While the indirect method involves gathering information on current locations for primate through consultation with experience Park Rangers, hunters, farmers and community leaders, counting of animal index such as feacal droppings, foot prints, calls, and feeding remnants, within each transect. These were related to relative abundance/distribution of Primates in a particular area at a particular time. Data was collected from November, 2017-August, 2019. Data was analyzed using distance software. Student t-test was used to compare between wet and dry seasons population. The results were presented in tables. The overall Population estimation revealed Papio anubis has the highest mean abundance (19 ± 0), population density (0.042 ± 0.000) and relative abundance of (6 ± 0) at Oli range and the species was not observed in the two ranges of Zugurma sector of the park. Individuals and troops recorded during the dry seasons exceeded those of the wet seasons in all the sectors during the study. The population structures (age and sex) adult female Olive Baboon has the highest mean of individual in all seasons with (140 ± 41) the least in the troop been the Sub-adult male with (32 ±6). The Olive baboons were observed to be social and a very popular attraction for park staff that resident in the Oli camp, visitors and researches alike.

Keywords: Baboon, Population, status, age structure, sex structure

INTRODUCTION

Nigeria is rich in wild fauna resources, she can therefore boast of a high biodiversity. There are 22,000 vertebrates and invertebrates species, about 20,000 insect, 1,000 bird, 1,000 fish, 247 mammal and 123 reptile species (Nigeria Fourth National Biodiversity Report) (NFNBR, 2010). The diversity of Nigeria's wild animals can be attributed to the country's tropical location, size and its ecosystem Food Agricultural Organization, (FAO, 2000). In Nigeria the primates form part of the population of wildlife in the various ecological zones. A Primate is a Mammal of the order Primata (Latin: "prime, first rank").The Primate Order includes lemurs, lorises, tarsiers, New World monkeys, Old World monkeys, Apes and humans. Non-human primates

are an almost exclusively tropical radiation, and there are currently over 200 species of primates living in the tropics of Asia, Africa and the Americas (Colinshaw and Dunar, 2000). The Africa region has the highest concentration of non-human primate diversity on the planet earth. Nigeria is one of the five (5) top twelve (12) countries on earth for primate diversity (Kone and Russell, 2019). However, the conservation and management of non-human primates and of their habitats is one of Africa's foremost challenges in sustainable development (Kone and Russell, 2019). In Nigeria, a major problem facing wildlife conservation is the increasing rate of habitat loss to modification due to human activities (Ogunjemite, 2017). There is no doubt that there has been a continuous destruction

and mismanagement of the savanna ecosystem of the country where a reasonable population of the country non-human primates which this study focused on has been negatively affected. Modern conservation in highly dependent on data on the abundance of species within an area, since it provides a basis for making practical conservation decisions (Tosh, Revers, and Van Jaarsveld, 2004).

The Olive Baboon belongs to the family Cercopithecidae which has the largest number and the widest distribution in Nigeria. This family includes twenty-two (22) genera and one hundred and thirty-three (133) species. These monkeys are widely distributed in the Old World from Southern Europe (Gibraltar) into North West Africa; throughout Africa South of the Sahara; and through Central and South East Asia, including southern China and most of Japan. The member of Old World monkeys belonging to one family Cercopithecidae, with 81 species in 18 genera which are associated to Apes and human and they are known as Catarrhines (meaning "downward-nosed" in Latin) (Grooves, 2005).The Olive Baboon is a very large terrestrial monkey, with arms and legs of similar length, a relatively short tail and elongated muzzle. The tail has a distinct kink; at first it rises steeply from the rump (for about one-fourth of its length) then fall away sharply. The facial skin is dark gray to black, and the ischial callosities dark purplish gray. The nostrils at the end of the prominent muzzle protrude beyond the plane of the upper lip. It has a pronounced sexual dimorphism, with adult males being much larger than females. Adult males have a mane on the shoulder, but this is less strongly developed than in some other baboon species, such as *Papio, papio*. Adult females develop large peri-ovulatory genital swellings (Oates, 2011).

Adult Olive Baboon have a head and body length of 75cm in males and 60cm in females, and tail length of 50cm in males and 45cm in females (Napier, 1981). Adult males average about 23kg (but can reach weights of up to 37kg) and adult females average 14kg (with maximum weight of 18 kg) (Delson, 2000). This research focus on the population status of the Olive Baboon *Papio anubis*

in the Kainji Lake National Park, in as much as, ecological knowledge and information on the population status of the Olive Baboon must be sustain to have a basic information on trend and possible change in population of the species in the study areas.

MATERIALS AND METHODS
Study Area
Location and size
Kainji lake National Park has a landmass of $5,340km^2$ and comprises two sectors; Borgu sector $(3,470km^2)$ in Borgu local Government and Zugurma sector $(1,370km^2)$ in Mashegu Local Government Area. The landmass coverage of the park extends to some part of Kwara State in Nigeria (Ayeni, 2007). Kainji Lake National Park is situated in the boundary between the North of Guinea Savanna, although in some areas it appears more Sahelian. Riparian Forests also occur on the banks of larger water courses e.g. River Oli (Ezealor 2002). Generally the vegetation is described as been Northern Guinea Savanna types which are formations of Mosaic of plant communities contrasting in structure and *Burkea/Detarium* woodland, *Afzelia/Anogeissus/Detarium* woodland, Manyara complex etc (Ezealor 2002).

Park Protection Administration
According to (Ayeni, 2007) the two sectors are divided into 8 protection zones or ranges; two (2) for Zugurma and six (6) in Borgu. Competent officer known as Sectorial Head superintend on each sector and a Range Head supervises the ranges in each of the eight (8) ranges. The Zugurma sector has two (2) ranges are: Ibbi range with field office at Ibbi and Kulho range with field office at Kulho. The Borgu sector has six (6) ranges are: Oli range with field office at Oli, Doro Range with field office at Malale; Kali Range with the field office at Kali, Kuble range with the field office at Kuble. The Borgu sector-Kwara state consists of the following ranges: Worumokoto with the field office at Worumokoto, while Kemenji range has its field office at Kemenji. Within each range, park rangers are stationed at in their Ranger post or out stations now regarded as beats.
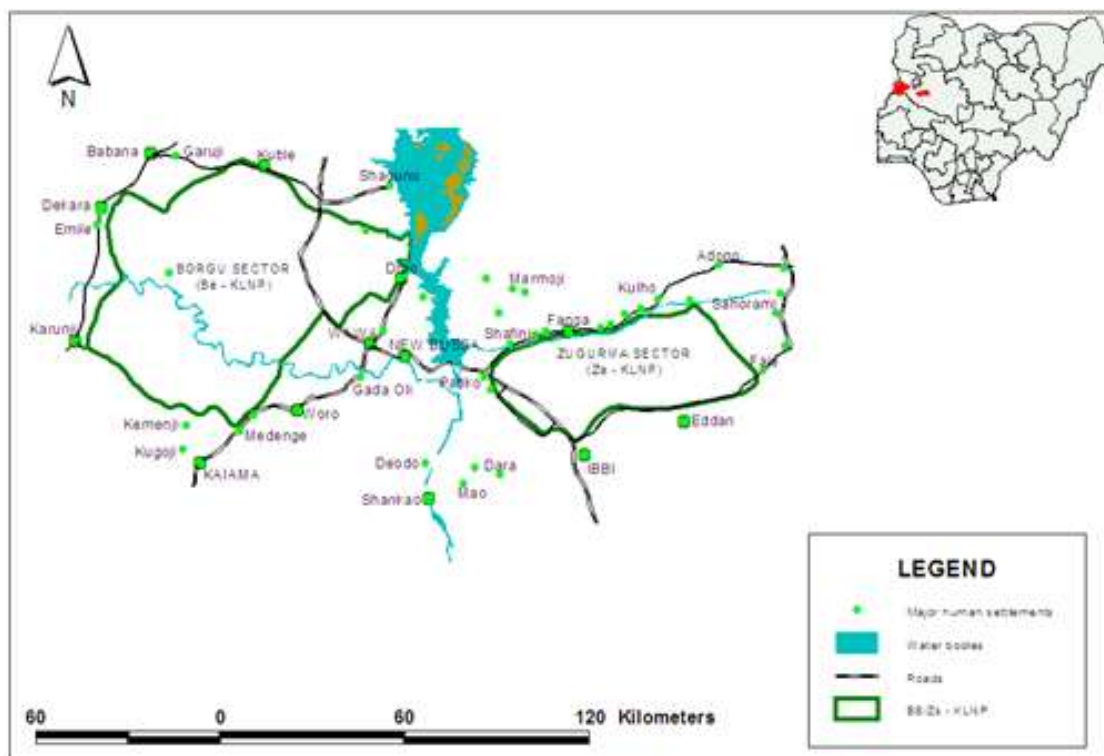
Figure 1: Map of KLNP Showing its Location in Relation to the Surrounding Villages
Source: Kainji Lake National Park Research unit

Methods of Data Collection
Line transect method

Line transect method was used to enumerate primate population within the study areas. On each transect direct observation and indirect methods were used. The observation were conducted daily on separate transect (i.e. in the morning 0600hours to 09.00hours or evening 16.00 hours to 19.00 hours) for two (2) consecutive days every month for three months during the dry season and the same experiment were carried out also during the wet season. Two (2) transects of 3km length each totaling 6km were marked in each of the selected ranges within their home range in the park . Observation was conducted walking quietly along each transect. Observations were recorded using standardized data sheet which contain information on numbers of individuals, habitat types, location, time of sighting, sighting distances, perpendicular distance, date, activities when sighted, season, records of numbers of individuals, group, species,

sex (Male and Female) and age structure (Adult, Sub-adult, Juvenile and young), activities when sighted. When any animal or group of animals was sighted a standard time of ten minutes was spent observing and taking records of their activities. Data were analyses using descriptive statistics such as frequency tables, to describe results. The student t-test analysis was used to compare sighting rate between wet and dry seasons.

RESULTS
Seasonal Estimation of Olive Baboon in Kainji Lake National Park

Presented in table 1 is the seasonal estimation of *Papio anubis* in the study area. The highest mean abundance (12 ± 0), population density (0.026 ± 0.001) and relative abundance of (4 ± 0) were recorded in Oli range in the dry season. *Papio anubis* is conspicuously absent in the two ranges (Ibbi and Kulho) of Zugurma sector of the park as showed in (table 1)

Table 1: Seasonal Estimation of Olive Baboon in Kainji Lake National Park, from Nov., 2017- Aug., 2019

Ranges	Dry Season Mean Abundance	Population density	Relative abundance	Wet Season Mean Abundance	Population density	Relative abundance
Oli	12 ± 0	0.026 ± 0.001	4 ± 0	7 ± 1	0.016 ± 0.001	2 ± 0
Doro	5 ± 0	0.010 ± 0.000	2 ± 0	3 ± 0	0.006 ± 0.000	1 ± 0
Kali	3 ± 0	0.006 ± 0.001	1 ± 0	1 ± 0	0.003 ± 0.001	0 ± 0
Worumakoto	2 ± 0	0.005 ± 0.001	1 ± 0	1 ± 1	0.003 ± 0.001	0 ± 0
Ibbi	*	*	*	*	*	*
Kulho	*	*	*	*	*	*

Key: * No data; Mean ± Standard error at 95% confidence limit

Presented in table 2 are the population indices of *Papio anubis* in the study area. The highest mean abundance (19 ± 0), population density (0.042 ± 0.000) *Papio anubis* indices were conspicuously absent in the two ranges (Ibbi and Kulho) of Zugurma sector of the park.

Table 2: Population indices of Olive Baboon in Kainji Lake National Park, from Nov., 2017- Aug., 2019

Ranges	Mean Abundance	Population Density	Relative Abundance
Oli	19 ± 0	0.042 ± 0.000	6 ± 0
Doro	7 ± 0	0.016 ± 0.001	2 ± 0
Kali	4 ± 1	0.009 ± 0.002	1 ± 0
Worumakoto	4 ± 1	0.009 ± 0.001	1 ± 0
Ibbi	*	*	*
Kulho	*	*	*

Key: * No data; Mean ± Standard error at 95% confidence limit

Presented in table 3 were the population estimates of *Papio anubis* in the study area. The animal were encounter more during the wet season with (10.000 ± 0.00) compare to the dry season and the effective strip width more closer during the dry season with (221.30 ± 16.14) than in the wet season.

Table 3: Population estimate of Olive Baboon in the study areas, from Nov., 2017- Aug., 2019

Estimates/Species	Borgu			Zugurma		
Park Sectors	Dry season	Wet season	Overall	Dry season	Wet season	Overall
Encounter rate (per km)	8.333 ± 0.00	10.000 ± 0.00	10.333 ± 0.00	*	*	*
Effective strip width (m)	221.30 ± 16.14	290.10 ± 30.27	221.20 ± 17.35	*	*	*
Detection probability	1.00 ± 0.16	1.00 ± 0.3027	1.00 ± 0.1735	*	*	*
Density (Baboon's km^{-1})	18.828 ± 3.040	17.24 ± 5.2174	23.357 ± 4.0532	*	*	*

Key: * - No data

Table 4: Seasonal Population Variation of the Olive Baboon

Species	Abundance	Population density		Relative abundance		
	Mean	t (P)	Mean	t (P)	Mean	t (P)
Olive Baboon	5.50 ± 3.00	0.94 (0.44)^{ns}	0.012 ± 0.007	0.82 (0.43)	2.00 ± 0.75	1.46 (0.60)^{ns}

*t = t value, p = p value; * signifies the parameter is significantly important (p ≤ 0.05) while ns signifies the parameter is non-significantly important (p > 0.05)*

The presentation of table 5 shows adult female recorded the highest population during the study in Oli range with (8.78 ± 0.62) and least was sub-adult male in Doro range with (1.45 ± 0.25). Male to Female ratio is 1:2:63 in the dry season.

Table 5: Age Structure and Sex Ratio of Olive Baboon in Kainji Lake National Park, from Nov., 2017-Aug., 2019 (Mean of individual in dry season)

Structures	Park	Ranges		
	Oli	Doro	Kali	Worumakoto
Adult Male	2.42 ± 0.28	1.45 ± 0.25	1.75 ± 0.75	1.7 ± 0.3
Adult Female	8.78 ± 0.62	3.25 ± 0.25	3.45 ± 0.15	2.85 ± 0.65
Sub-adult male	1.8 ± 0	1.45 ± 0.25	1.5 ± 0.5	1.75 ± 0.25
Sub-adult Female	1.7 ± 0.1	2.25 ± 0.25	2.25 ± 0.25	4 ± 1
Juvenile	2.2 ± 0.2	2.25 ± 0.25	2.15 ± 0.15	1.75 ± 0.05
Young (infants)	2.45 ± 0.05	2.15 ± 0.15	2.15 ± 0.15	1.8 ± 0
Ratios				
M: F	1:2.63			
SAM: SAF	1:1.58			
J: O	1.16:1			

KEY: AM =Adult Male, Adult Female, SAM = Sub-Adult Male, SAF = Sub-Adult Female, J = Juvenile, O = Others

The presentation of table 6 shows adult female recorded the highest population during the study in Doro range with (4.5 ± 0.2) and least were Adult Male and Sub-Adult Male in Doro range with (1.25 ± 0.25) each. Male to Female ratio is 1:2:30 in the wet season.

Table 6: Age Structure and Sex Ratio of Olive Baboon in Kainji Lake National Park, from Nov., 2017-Aug., 2019 (Mean of individual in wet season)

Structures	Park	Ranges		
	Oli	Doro	Kali	Worumakoto
Adult Male	2.55 ± 0.75	1.7 ± 0	1.4 ± 0.1	1.25 ± 0.25
Adult Female	4.05 ± 0.55	4.5 ± 0.2	1.65 ± 0.65	1.5 ± 0
Sub-adult male	1.7 ± 0	1.5 ± 0	1.25 ± 0.25	1.25 ± 0.25
Sub-adult Female	2.25 ± 0.25	1.85 ± 0.15	1.5 ± 0	2.5 ± 0
Juvenile	1.8 ± 0	1.8 ± 0	1.5 ± 0.2	1.6 ± 0.2
Young (infants)	1.5 ± 0.2	1.5 ± 0.2	1.85 ± 0.15	1.8 ± 0.5
Ratios				
M: F	1:2.30			
SAM: SAF	1:1.38			
J: O	1.09:1			

KEY: AM=Adult Male, Adult Female, SAM=Sub-Adult Male, SAF=Sub-Adult Female, J=Juvenile, O=Others

DISCUSSION

Papio anubis has the highest mean abundance (12 ± 0), population density (0.026 ± 0.001) and relative abundance of (4 ± 0) at Oli range in the dry season. *Papio anubis* is conspicuously absent in the two ranges (Ibbi and Kulho) of Zugurma sector of the park. This is in agreement with the findings of (Ajayi *et al.*, 2019) who reported that the primate was not reported among wild animals that raids farms in the Zugurma sector by the farmers. The

overall Population estimation revealed *Papio anubis* has the highest mean abundance (19 ± 0), population density (0.042 ± 0.000) and relative abundance of (6 ± 0) at Oli range and the species was not observed in the two ranges of Zugurma sector of the park. This finding is in agreement with the report of (Alarape, *et al*., 2019) that a higher spatial distribution of Olive Baboon was reported in Oli range out of the three (3) other range used for the study in Borgu sector of the park. This may be connected to the fact that this range is at the heart of the Borgu sector of the park. It also enjoys some measure of protection due to the frequency of tourists inflow into that part of the park on a regularly bases. (Kunz and Linsenmair, 2008a) reported a density of 1.2 individuals/km^2 in the more open habitat of Comoe National Park, Cote d'Ivoire. Individuals and troops recorded during the dry seasons exceeded those of the wet seasons in all the sectors during the study. Adult female Olive Baboon has the highest mean of individual in dry seasons with (8.78 ± 0.62) in Oli range and the least on the rank was Adult male and Sub-adult male with (1.45 ± 0.25) each. According to (Oates, 2011) reported that female Olive baboons remain in the group in which they are born, while male move between groups after puberty. (Alarape, *et al*., 2019) revealed that adult males defend the group against other male intruders which makes them vulnerable to life threatening scenarios that sometimes lead to death. This natural attributes gives more opportunities for the sighting of more female population in each of the troops studied. All the ranges recorded a viable age and sex structures. These show that the animal population enjoys viable and sustainable habitat structure which provided the essential component such as food, cover and shelter for the primate's population. According to (Alarape, *et al*., 2019) report in Kainji Lake National Park the male to female ratio of olive baboon was 1:2:13. However, the seasonal report of this study there was

an increase in the sex ratio during the dry season with 1:2:63 compare the value in the wet season with 1:2:30.

The Olive baboons *Papio anubis* were observed to be social, tame and a very popular attractions for park staff that resident in the Oli camp, visitors and researches alike. These primates could be an occasional nuisance to the inhabitants of the camp through their activities in the Oli camp throughout the seasons. They often come close to the different chalets and other human accommodations in the Oli camp to feed from the left over foods in the each of the waste basket that where positioned in different areas of the camp. According to (Chapman and Russo, 2007) Primates contribute as model for human evolutionary research, their value to ecotourism and their charisma; plays important ecological roles, especially as seed dispersers. In the course of this field study in the park there was not any report of attack from the Olive baboons *Papio anubis* on the park staff, visitors and researches alike. Instead the animals disturb, entertain, inspire, serves as an attraction and regular sighting options for most tourists to the park throughout the year especially Oli range.

CONCLUSION

The Olive baboons *Papio anubis* population is stable, with an optimum sex ratio which show that the habitat of the animal is viable in Borgu sector of the park. But the animal were conspicuously absent in all the two ranges of Ibbi and Kulho that made up the Zugurma sector. The population revealed a healthy sex and age structures with all categories properly represented in the four (4) ranges of the six (6) ranges that this study covered. Further study should be carried out on the ecotourism potential of the Olive Baboon and other primates' species in the park.

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