Abundance and Distribution of Patas Monkey (*Erythrocebus patas* Schreber, 1775) in Kainji Lake National Park, Nigeria

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ABSTRACT

Assessment of abundance and distribution of Patas monkey in Kainji Lake National Park (Zugurma sector) was carried out from March to July, 2019. Data were collected using direct sighting (Census by Ground Survey Method) and line transect method using the existing jeep tracks. The location was transverse in the morning between (7:00 and 11:00 a.m.) and in the evening (16:00 to 18:30 p.m.), binocular was used for viewing of animals. Data obtained were analyzed using descriptive statistics in the form of table and frequency count. The spatial distribution of Patas monkey (*Erythrocebus patas*) in the study area revealed that Mayara track had the highest percentage (32.2%), followed by Abubakar mashegu track with (27.1%) while Etsu usman track recorded the least percentage (16.9%). It also indicates that month of April had the highest number (20) while the month of July 2019 recorded the least one with (8). The population structure revealed that female had the highest frequency 34, followed by male recorded frequency with 25 while young had the least frequency 15. The food eaten by Patas monkey in the study area are *Cercocephalis laurifolis, Piper guineenis, Vitelaria paradoxa, Tarminrandus indica, Annona senegalensis* and *Ficus species*, respectively. The forage utilization showed that seed is the most utilized part of the plant they feed on. Human wildlife conflicts could be a major setback for the conservation of this animal as these animals migrate to support zone community's agricultural farm to feed on their crops during the dry season and cause a lot of damage to their corps. This can make the supporting zone community to have a negative attitude towards the conservation of Patas monkey.

*Keywords***:** Patas monkey, Kainji Lake National Park, *Erythrocebus patas*, Primates, habitats

1. INTRODUCTION

The rate at which wild animals, including primates, are becoming endangered or even going extinct, calls for regular inventory of all species (Ogada *et al*., 2003). The management plan of park is usually based on adequate information on the resources of the park. Similarly, information on the check list of wildlife and the current estimates of their conservation status is always of prime importance to tourists. Ayodele *et al*., (1999) emphasized the need for a regular inventory of wild animals in protected areas, as this will form the basis for sound management and ecotourism. Regular inventory provides information about the population of the animal in the wild. The conservation status of wildlife species refers to the population of the wild animals in their natural environment particularly in protected or conserved area such as game reserves, national parks and strict nature reserves (Ajayi and Hall, 1975). It gives the present state of abundance and adequacy for reproduction (Owen-Smith and Mills, 2008).

The reason for regular inventories is to obtain information on the current estimates of the level of conservation or preservation of the wild animals due to problems caused by change in their habitats (Barbara *et al*., 1987). Some changes in environmental conditions can be beneficial and lead to an increase in population size (Roots, 2007, Cheney, 2018). At the other end of the spectrum, extreme circumstances can result in a catastrophic decrease in numbers leading to a species becoming locally extinct (Dannenfeldt, 2005). The distribution of animals in relation to their environment is essential in game management and range utilization control (Ivan-Crab, 2010).

Afolayan (1979) reported that the distribution and movements of wild animals are usually affected by the availability of water, food, cover and bush burning particularly during the dry season. He showed that over eighty percent (80%) of the vegetation of the park is burnt indiscriminately every year. The effect of misuse of fire in the park by poachers has resulted in soil erosion and destruction of forage grasses (Nakagawa, 2000). This may also lead in certain part of the park to vegetation changes that are found to influence the wildlife population and their distribution within the park (Ogutu *et al*., 2011), because food and cover requirements of wild animals within the area will be altered (Isbell *et al*., 1998). Thus many wild animals have now become extinct, rare or endangered.

The information will be used to determinant the management principle for the endangered ones. The international union for nature conservation (IUCN) has given the standard populations for the categorization. As regards primates, no adequate researches on the conservation status of most of them have been carried out, particularly in Kainji Lake National Park. Primates' performances depend on habitats. Habitat destruction which has adversely affected primates has shown that it is only the baboon that is encouraging unlike the red patas and the green monkeys (Barbara *et al*., 1987). The primate population has been greatly reduced in the forest because their habitat has been under pressure for the extraction of minerals, timbers, agriculture, road construction and other human activities (ACNP 1981). Further observation has shown that habitat destruction is the most important factor threatening the existence of non-human primates, since about of all primates species occur in tropical forest of Asia Africa, south and Central America.

Around Kainji Lake National Park (KLNP), land hunger due to increase in human desires for space to meet their livelihood needs is of great concern (Ogunjobi and Adeola, 2016; Adeola *et al*., 2018). According to Andrade and Rhodes (2012) restricting local access to natural resources, which can play a crucial role in their livelihoods, health and culture might favour

biodiversity conservation in the short term. In Nigeria, many rural people living close to a protected areas depends directly on natural resources for their livelihoods and food security, while this wildlife causes losses as well as poses threat to man and his livestock. In western Uganda, for example, crop raiding has been identified as a key form of human-wildlife conflict and the most important perceived disadvantages of farming close to protected areas (Archabald and Naughton-Treves, 2001; Akande, 2019; Fingesi, 2019).

Patas monkey is known to play a dual to human either positive, (medical research and ecotourism), or negative (invasion and destruction of farmland) (Isbell *et al.* 1998). Insufficient data on its distribution and abundance could be a major setback to management approaches for its conservation. There is need to know if its population is to be increased or controlled. Information about the animal has been scanty on the park and it is on this basis that it becomes imperative to investigate the animal in the Park to know the status of the species, identify their home range and make useful suggestion on conservation. This type of study is also very important for better understanding of the species requirement and provide a predictive basis for the planning of game viewing and physical development in the park.

2. METHODOLOGY

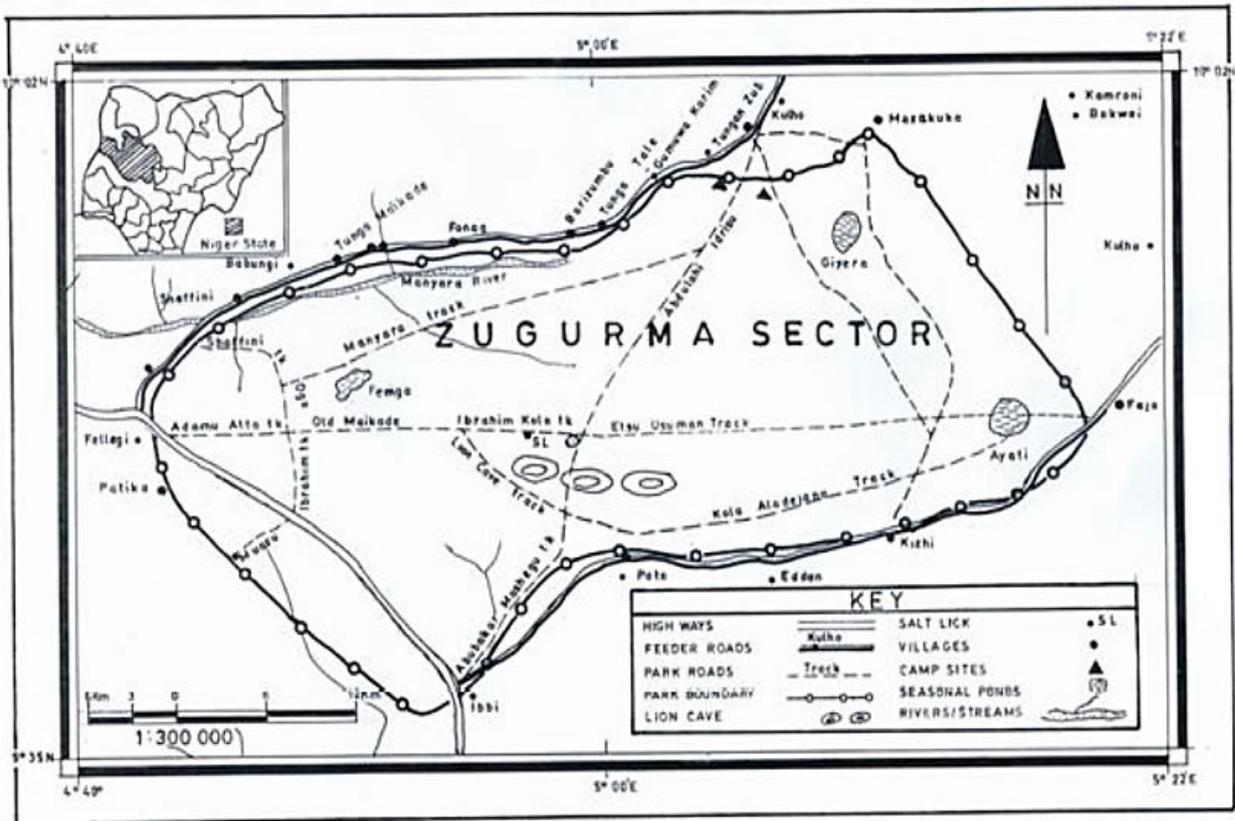### 2. 1. Description of the Study Area

Figure 1. Map showing Zugurma Sector of Kainji Lake National Park
Source: Development Research Bukeam (DRB) 2003.

Kainji Lake National Park is located in the North West central part of the country between latitude 9°45´N and 10°23´N and longitude 3°40´E and 5°47´E. It is made up of two sectors (Borgu and Zugurma) situated in Borgu and Kaima/Baruten Local Government Areas of Niger and Kwara State, respectively. It covers a total land area of 5,340.825 km^2. But this research was carried out in Zugurma Sector which is situated in the land area shared between Magama and Mashegu LGAs of Niger State. The tributary of Kontagora River on the Northwest side and River Manyara on the north borders the Zugurma Sector.

2. 2. Methods of Data Collection

A reconnaissance survey was carried out to Zugurma sectors of the park to determine the areas of concentration of Patas monkeys. The study was carried out for five months (March to July, 2019). Direct sighting (Census by Ground Survey Method): King census method described by Rodger (1978) and line transect method using the existing jeep tracks as described by Suthelad (1997) were used. The location was transverse in the morning between (7:00 and 11:00 a.m.) and in the evening (16:00 to 18:30 p.m.), binocular was used for viewing of animals and the activity during sighting was recorded.

2. 3. Data Analysis

The data obtained were entered into data sheet in the field. The data were analysed using descriptive statistics in the form of tables, charts and frequency distribution.

3. RESULTS

Table 1 reveals the Spatial distribution of Patas monkey (*Erythrocebus patas*) in Zuguruma sector of kanji lake national park, in the four tracks from March –July, 2018; Mayara track had the highest percentage (32.2%), followed by Abubakar mashegu track with (27.1%) while Etsu usman track recorded the least percentage (16.9%). The Table also shows the month of April had the highest number (20), the month of March had 18 observations while the month of July recorded the least with (8). **Table 2** shows the population structure of Patas monkey (*Erythrocebus patas*) in the study area; it was revealed that female had the highest frequency 34, followed by male recorded frequency with 25 while young had the least frequency 15. **Table 3** shows the food eaten by Patas monkey in the study area, eleven (11) plant species were identify as food of Patas monkey (*Erythrocebus patas*). The plant species includes *Cercocephalis laurifolis, Piper guineenis, Vitelaria paradoxa, Tarminrandus indica, Annono senegalensis* and *Ficus species*, respectively. The forage utilization showed that seed is the most utilized part of the plant they feed on.

Table 1. Spatial Distribution of Patas Monkey (*Erythrocebus patas*) in Zuguruma sector of Kanji Lake National Park

TRACKS	March	April	May	June	July	Total	Percentage (%)
Mayara	7	5	2	3	2	19	32.2

Abubakar mashegu	3	5	3	2	3	16	27.1
Maigiyeya	5	3	2	3	1	14	23.7
Etsu usman	3	2	2	2	2	10	16.9
Total	**18**	**20**	**9**	**12**	**8**	**59**	**100.0**

Table 2. Population Structure of Patas Monkey (*Erythrocebus patas*) in the Study Area

TRACKS	Number of male sighted	Number of female sighted	Young	Total
Mayara	6	9	4	19
Abubakar mashegu	7	5	4	16
Maigiyeya	5	4	5	14
Etsu usman	3	5	2	10
Total	**25(42.3)**	**34(57.7)**	**15(25.4)**	**59**

Table 3. Food of Patas Monkey (*Erythrocebus patas*) in the Study Area

S/N	Scientific name	Part utilized
1	*Cercocephalis laurifolis*	Seed
2	*Piper guineenis*	Seed
3	*Vitelaria paradoxa*	Seed
4	*Tarminrandus indica*	Seed
5	*Annono senegalensis*	Seed
6	*Ficus species*	Seed
7	*Isoberlina tomentosa*	Seed
8	*Piliostigma thonigii*	Seed
9	*Nuclear latifolia*	Seed
10	*Parkia biglobosa*	Seed
11	**Prosopis Africana**	**Seed**

4. DISCUSSION

A total of 59 individuals of *Erythrocebus patas* were sighted in all the tracks, the highest observation was recorded in Mayara and Abubakar mashegu tracks (32.2% and 27.2%, respectively). The highest abundance group recorded in these ranges may be connected with the fact that these tracks provide enough food, water, cover and breeding space for wildlife species throughout the year. Also, the presence of anti-poaching patrol post in these tracks might have facilitate adequate protection of wildlife population in the tracks thereby supporting increase in the population of wildlife population in these tracks and at the same time increasing food resources of existing population of animals in the tracks.

This observation supports the view of Infield and Namara (2001) and Kideghesho *et al*., (2007) that good quality habitats may have improvement in animal population and their distribution. However, the presence of River Manyara which are concentrated in these two tracks ensures constant provision of drinking water for primate population throughout the year. This river also provides breeding ground and cover for various wildlife species in the park including *Erythrocebus patas* most especially in the dry season when other water holes in the park must have dried, which result to high concentration of animals in these tracks. This indicates that availability of food, water, cover and breeding space influence the distribution and abundance of wild animals in a particular tracks, as observed by (Nakagawa, 2000). Maigiyeya and Etsu usman tracks harboured the least abundance of (23.7% and 16.7%, respectively) (Silk, 2018; Schamberg, 2017).

The least abundance of *Erythrocebus patas* recorded in these habitats might have been a result of the fact that these tracks are located along the park boundaries, thereby experiencing serious habitat disturbance ranging from poaching, illegal farming and illegal logging. This may not be unconnected with the fact that in the dry season, many thickets and vegetation must have been exposed through foliate destination thereby increasing visibility for game viewing, therefore making sighting of wild animals easier, whereas in the wet season the vegetation is usually over grown, making sighting of wild animals very difficult due to very poor visibility (Sitati *et al*., 2005). The population structure of *Erythrocebus patas* shows that had male and female higher population with the structures of 57.7% and 42.3%, respectively. It was generally observed that this is an indication that the animal has the potential to maintain and sustain its population potential in the near future, provided various illegal human activities in the park addressed. River Manyara which does not dried up completely in the dry season provides all the necessary ecological requirements for the animals, especially during the dry season, thereby, attracting primates species and other wild animals in the park.

Eleven (11) plant species were identified as food eaten by *Erythrocebus patas* in the study area; the plant species includes *Cercocephalis laurifolis, Piper guineenis, Vitelaria paradoxa, Tarminrandus indica, Annono senegalensis* and *Ficus species*, respectively. The forage utilization showed that seed is the most utilized part of the plant they fed on this tracks. This was in line with Mendoza and Palmqvist (2007).

5. CONCLUSION

This study revealed that Kainji Lake National Park provides an enabling environment for Patas monkey as it provides the animal basic requirement of food, water and shelter. The

distribution of the animal is influenced by the proximity to source of water and varieties of food resources. Human wildlife conflicts could be a major setback for the conservation of this animal as these animals migrate to support zone community's agricultural farm to feed on their crops during the dry season and cause a lot of damage to their corps. This can make the supporting zone community to have a negative attitude towards the conservation of Patas monkey.

Recommendation

- The ecology of the patas monkey should be studied in details and emphasis should be placed on the habitat requirements
- There should be inventory of other wildlife species in this sector of the park
- Awareness education to bring positive required behavioral changes among the farmers should be carried out; poverty alleviation program should be initiated
- Employment opportunity should be given to the farmers and if possible, relocation of farm land far away from the park should be done.

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