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PRELIMINARY SURVEYOFPRIMATES IN OLD OYO NATIONAL PARK BUFFER ZONE, NIGERIA

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ABSTRACT

Many of buffer zones surrounding Nigerian protected areas are under-managed. The study examined the abundance, distribution and population structure of some primates' species: Patas monkey (Erythrocebus patas), Olive baboon (Papio anubis) and Green monkey (Cercopithecus aethiops) in Old Oyo National Park buffer zone. Five 3×2 km transects were laid in the buffer zone of all the ranges (Ogun-Tede, Marguba, Sepeteri, Oyo-Ile and Yemoso) of the Park. The transects were traversed for a period of 12 months. Observations were based on direct censusing techniques only. The wet season results showed that Ogun-Tede had the highest primate species relative abundance of 5.67 (±0.2814)/km^{2}followed by Yemoso with 3.17 (±0.1471)/km^2, while Marguba range had the lowest primate species relative abundance of 1.17 (±0.0557)/km^2.Erythrocebus patas had the highest number of individuals in a group per square kilometer 0.0560 (±0.0168), while Cercopithecus aethiops had the least number of individuals in a group per square kilometer 0.0093 (0.0047). In the dry season, Ogun-Tede had the highest primate species relative abundance of 4.00 (±0.2009)/km^{2}followed by Yemoso with 2.67 (±0.1248)/km^2.Papio anubis had the highest number of individuals in a group per square kilometer 0.0322 (±0.0107), while Erythrocebus patas had the least number of individuals in a group per square kilometer 0.0068 (±0.0029).Juveniles constituted most primate species population structure in both wet and dry season which ranged between (7.00 and 25.61%)and(9.33 and 59.57%) respectively. Measures to maintain and mildly protect the existing population of these primates in land adjacent the Park should be encouraged.

Keywords: Buffer zone, Primates, Population, Distribution, National Park,

INTRODUCTION

The designation of protected areas is one of the most important conservation strategies available to societies (Chape *et al*., 2005). However, long-term conservation of biodiversity cannot be achieved if the relationships between these zones and the areas that surround them are not considered (McNeely, 1994; IUCN, 2004). A number of studies have shown that intensive land use has recently increased around many protected areas (Joppa *et al*., 2008; Svancara*et al*., 2009; Radeloff*et al*., 2010; Gimmi*et al*., 2011) and that we cannot, as a consequence, manage them as isolated and static entities (Bengtsson*et al*., 2003). Within the framework of an ecological network strategy, the definition of a buffer zone should integrate both landscape and functional attributes. A definition based on the ecological function(s) of the buffer zone should focus on its main management objectives (Miklos*et al*., 1995): to protect from the expansion of harmful man activities; sustain positive landscape interactions and sustain natural and man-made flows in the landscape.

Nigeria has a rich and diverse mammalian faunal resource of about 250 species belonging to 13 orders, 42 families and 133 genera (Happold, 1987). Sixty-five mammalian species which include 21 primates among which are *Erythrocebus patas*,

Papio anubis and *Cercopithecus aethiops* are found in Old Oyo National Park (Ayodele, 1989; Afolayan*et al*., 1983). Despite the importance of biodiversity of the ecosystem to man, human being has caused extermination of species through their unfriendly environmental activities which include destruction of wildlife habitats, unsustainable agricultural practices, over-exploitation, industrialization, bush burning, hunting and poaching (Linden, 2000). This destruction remains a serious threat to development and sustainable living.

The Patas monkey (*Erythrocebus patas*)

The Patas monkey (*Erythrocebus patas*) is one of the medium-sized primates distributed from semi-arid areas of West to Eastern Africa. It is recognized by its different names like Red or Hussard monkey given due to its red-brown and silver-grey morphological colour. It is also named as crying monkey after the weeping sounds of its young (Galat-Luong, 1992). Patas monkey is a semi-terrestrial primate typically living in multi-female or single-male social groups composed of 75 individuals (De Jong *et al*., 2009).

The Olive Baboon (*Papio anubis*)

The olive baboon is named for its coat, which, at a distance, is a shade of green-grey (Cawthon-Lang, 2006a). Its alternative name comes from the Egyptian god Anubis, who was often represented by a dog head resembling the dog-like muzzle of the baboon. At closer range, its coat is multicolored, due to rings of yellow-brown and black on the hairs (Rowe, 1996). The hair on the baboon's face, however, is coarser and ranges from dark grey to black (Cawthon-Lang, 2006a). This coloration is shared by both sexes, although males have a mane of longer hair that tapers down to ordinary length along the back (Shefferly, 2004).

The Green Monkey (*Cercopithecus aethiops*)

The green monkey is an Old World monkey with golden-green fur and pale hands and feet (Kingdon, 1997; Cawthon-Lang, 2006b). The tip of the tail is golden yellow as are the backs of the thighs and cheek whiskers (Cawthon-Lang, 2006b). It does not have a distinguishing band of fur on the brow, like other species, and males have a pale blue scrotum (Cawthon-Lang, 2006b). As other members of the genus *Cercopithecus,* the green monkey is highly social and usually seen in groups. They usually live in groups of up to 7 to 80 individuals. Within these groups, there is distinct social hierarchy evidenced by grooming behaviours and gender relationships.

There is a paucity of information or none at all onthe abundance and distribution of large mammals (especially primates) in the buffer zones of Nigerian protected areas *(*which include the National Parks and other game reserves), and much of the data that are available were obtained mainly from mere guesses made by casual observers and visitors. The available information on the buffer zones of other reserves and National Park is inadequate, unreliable, and insufficiently scientific for efficient management of buffer zone of a protected area. Based on this gap, the study objectives were to determine the relative abundance, distribution as well as to prescribe how the existing population of *Erythrocebus patas*, *Papio anubis* and *Cercopithecus aethiops* in the buffer zone of Old Oyo National Park could be effectively managed.

MATERIALS AND METHOD

Study Area

Old Oyo National Park (OONP) derives its name from the ruins of Oyo-Ile, (Old Oyo) the ancient political capital of Yoruba Empire. The abundance of cultural features in and outside the Park with a combination of ecological and biodiversity sites places the Park in a very unique and advantageous position as a potential tourism destination. The historical sites can be visited from a number of short distant towns including Igbeti, Igboho, Kishi, Sepeteri, etc. OONP is located in the sparsely populated area of Irepo, Olorunsogo, Orelope, Atisbo, Iseyin, Oyo West, Oriire, Atiba, Itesiwaju, Shaki East Local Government Areas in Oyo State and Kaima in Kwara State. The Park has a total land mass of 2512 km^2 (making it the fourth largest national park in Nigeria) and is located in the South Western part of Nigeria, specifically Northern part of Oyo State. OONP is geographically located between latitudes $8^o15'$ and $9^o.00'N$ of the equator and longitudes $3^o35'$ and $4^o42'E$ of the Greenwich meridian. Old Oyo National Park (OONP) is considered as a mixed heritage site with outstanding natural and cultural values that if explored could serve as basis for its enlistment on the UNESCO

world heritage list as the first mixed heritage site in Nigeria (Oladeji, 2012).

A 3x2km transect was laid in each of the five buffer zone ranges in Old Oyo National Park. The total effective study area was 30km^2. Each transect was allowed to rest for 4-5 days after the construction of transects before data collection began to reduce human disturbance and to allow wild animals to return to their initial home range. The five transects were traversed in both dry and wet seasons, from 7.00 am to 1.00 pm and from 4.00 pm to 7.00 pm (local time) with an average walking speed of 2.0 km/hr. Periods of walking were interspersed with periods of 'silent', 'watch' and 'wait' in order to increase the possibility of detecting animals that might hide or flee upon the approach or movement of observers. Each transect was traversed twice in a month for period of 12 months. The counts of individual animals were made conservatively by only including individual seen. Vortex Diamondback Binocular (10x42mm) was used to observe and detect presence of animals. Animals sighted were identified as outlined and described by Jean and Pierre (1990). Information were collected on groups of animals sighted which included species, sex, sighting distance (m) and population structure such as, adult males, females, sub-adult males, sub-adult females and juveniles. Five basic assumptions were made as recommended by Burnham, (1980), Seber, (1982) and Dunn, (1993), which were: animals position directly over the transect line are not missed, animals are seen before they flee, none are counted twice, sighting of each animal or group of animals are done with certainty and all animals are distributed at random with respect to the transects. Relative abundance of individual sighted species was calculated according to (Fernanda *et. al.*, 2001). All transects points were adequately geo-referenced.

$$D = \left(\frac{ns}{2LW}\right)/km^2$$

where, D- relative abundance, n- number of groups/animals sighted, s- mean group size, L- area of transect and W- mean perpendicular distance. Body size, shape, female genital organs and udders were used to determine population structure.

RESULTS AND DISCUSSION

From the fauna abundance and distribution survey conducted in the wet season at the buffer zone in all the five ranges of Old Oyo National Park, Ogun-Tede had the highest primate species relative abundance 5.67 (±0.2814)/km^{2}followed by Yemoso with 3.17 (±0.1471)/km^2, while Marguba range had the lowest primate species relative abundance 1.17 (±0.0557)/km^2.*Erythrocebus patas* had the highest number of individuals in a group per square kilometer 0.0560 (±0.0168), while *Cercopithecus aethiops* had the least number of individuals in a group per square kilometer 0.0093 (±0.0047). The total number of primate species recorded in wet season was eighty-two (82) individuals (Table 1). However in the dry season,Ogun-Tede had the highest primate species relative abundance 4.00 (±0.2009)/km^{2}followed by Yemoso with2.67 (±0.1248)/km^2.*Papio anubis* had the highest number of individuals in a group per square kilometer 0.0322 (±0.0107), while *Erythrocebus patas* had the least number of individuals in a group per square kilometer 0.0068 (±0.0029).The total number of primate species recorded in dry season was fifty-four (54) individuals(Table 2).

The significant difference between wet and dry seasons' results may not be unconnected to the fact that there is food availability in the buffer zone during wet season. Farmers are busy ploughing and planting different crops, which these primate species come to feed upon. This agrees to the view of Newton (1998) and Benton *et al*., (2003) that food abundance influences the distribution and size of wild populations. Marguba range,having lowest number of primate individuals in wet season may be due to the fact that anthropogenic activities are not rampant in that range as it is the heart-beat of the park. It agrees with the assertion that wild animals are more distributed in areas with abundant food, water, space and mates.

Also, reduction in number of individuals may not be unconnected to the fact that food becomes scarce, hence reduction in available nutrients. This is in accordance with the submission of Williams *et al*., (1999) that the cessation of rain following the wet season and the extended dry season leads to a sharp decrease in the available nutrients in the vegetation.

Furthermore, individuals recorded in dry season may be low in number when compared to

individuals recorded in wet season. This could also be as a result of burning activity that is very pronounced during dry season which open up the habitat. Bowman (1998); van Langevelde *et al*., (2003); Bond and Keeley (2005) all observed that fire is a pervasive disturbance process globally, and it significantly shapes ecosystem structure and function. This reduced number of individuals in dry season is in agreement with the findings of Bowman (1998) and Yibarbuk*et al*., (2001) that late season fires are typically intense and result in the overall opening up of habitat, removal of shrubs and the rejuvenation of grasses. This supports the findings of Aremu and Emelue (2003) as well as the view of Onadeko*et al*., (1998). There was a significant difference ($P<0.05$) in the relative abundance of fauna species sighted in each of the ranges in the park. This showed that habitats quality determine distribution and abundance of wildlife species.

Table 1: Relative Abundance and Distribution of Fauna Species in OONP Buffer zone (Wet Season)

Range	**Primate species**			**Total**	**S.E**	**Relative abundance/km^2**
	EpPaCa					
Ogun-Tede	19	15	0	34	**±**0.5329	5.67±0.2814
Marguba	0	0	7	7	±0.2068	1.17±0.0557
Sepeteri	7	4	0	11	±0.3124	1.83±0.0879
Oyo-Ile	3	3	5	11	±0.3124	1.83±0.0879
Yemoso	12	7	0	19	±0.3897	3.17±0.1471
Total	**41**	**29**	**12**	**82**	**±1.7542**	**13.67±0.66**
MGS	**8**	**6**	**2**			
Grp/km^2	**0.0560**	**0.0398**	**0.0093**			
S.E	**±0.0168**	**±0.0125**	**±0.0047**			

Source: Field survey, 2016 and 2017
Ep- Erythrocebus patas, Pa- Papio anubis, Ca- Cercopithecus aethiops
MGS- Mean Group Size, S.E- Standard Error

Table 2: Relative Abundance and Distribution of Fauna Species in OONP Buffer zone (Dry Season)

Range	**Primate species**			**Total**	**S.E**	**Relative abundance/km^2**
	Ep	***Pa***	***Ca***			
Ogun-Tede	0	11	13	24	±0.4361	4.00±0.2009
Marguba	0	3	0	3	±0.1661	0.50±0.0328
Sepeteri	0	0	0	0	0	0
Oyo-Ile	3	3	5	11	±0.3579	1.83±0.0652
Yemoso	5	7	4	16	±0.3998	2.67±0.1248
Total	**8**	**24**	**22**	**54**	**±1.3599**	**9.00±0.4237**
MGS	**2**	**5**	**4**			
Grp/km^2	**0.0068**	**0.0322**	**0.0158**			
S.E	**±0.0029**	**±0.0107**	**±0.0098**			

Source: Field survey, 2016 and 2017
Ep- Erythrocebus patas, Pa- Papio anubis, Ca- Cercopithecus aethiops
MGS- Mean Group Size, S.E- Standard Error

Wet season survey in the buffer zone of all the five ranges in Old Oyo National Park revealed that juveniles constitute most primate species population structure which ranged between 7.00 and 25.61%, followed by adult females (6.00 and 21.95%) and sub-adult females (5.33 and 19. 51%).Sub-adult males had the least primate species population structure which ranged between 4.33 and 15.85%. *Erythrocebus patas* had the largest group size (41), while *Cercopithecus aethiops* had the least (12) (Table 3). Also,thedry

season survey in the buffer zone of all the five ranges in Old Oyo National Park showed that juveniles constituted most primate species population structure which ranged between 9.33 and 59.57%, followed by adult females (3.67 and 23.40%). Adult males had the least primate species population structure which ranged between 2.67 and 17.02%. *Papio anubis* had the largest group size (25), while *Erythrocebus patas* had the least (5) (Table 4).

Critically looking at the results in each of all the ranges in the park, there were more juveniles, adult females, sub-adult females and sub-adult males in the entire population. This proportion may aid and enhance the sustainability of the population as many reproductive females and males will be recruited into the effective and viable breeding population in the subsequent breeding seasons. This supports earlier view of Aremu and Emelue (2003). However, primates' species (*Erythrocebus patas*, *Papio anubis* and *Cercopithecus aethiops*) reproduce faster in a situation where there is abundance of food and water. This may not be unconnected with the fact that primates are more of generalist feeders than specialist feeders; feeding on varieties of leaves, fruits, twigs, tree barks and what man feeds on.

Table 3: Mean Population Structure of Primate Species in OONP Buffer zone (Wet Season)

Primate species	Adult males	Adult females	Sub-adult males	Sub-adult females	Juveniles	Number sampled (n)
Erythrocebus patas	6	9	8	11	**7**	41
Papio anubis	4	8	4	4	9	29
Cercopithecus aethiops	4	1	1	1	5	12
Total	**14**	**18**	**13**	**16**	**21**	**82**
Means	**4.67**	**6.00**	**4.33**	**5.33**	**7.00**	
(%)	**17.07**	**21.95**	**15.85**	**19.51**	**25.61**	

Source: Field survey, 2016 and 2017

Table 4: Mean Population Structure of Primate Species in OONP Buffer zone (Dry Season)

Primate species	Adult males	Adult females	Sub-adult males	Sub-adult females	Juveniles	Number sampled (n)
Erythrocebus patas	0	0	0	0	5	5
Papio anubis	6	8	0	0	11	25
Cercopithecus aethiops	2	3	0	0	12	17
Total	**8**	**11**	**0**	**0**	**28**	**47**
Means	**2.67**	**3.67**	**0.00**	**0.00**	**9.33**	
(%)	**17.02**	**23.40**	**0.00**	**0.00**	**59.57**	

Source: Field survey, 2016 and 2017

CONCLUSION

It could be generally concluded that Old Oyo National Park buffer zone is rich in primate species. The findings from this study indicated that buffer zone of Old Oyo National Park should be well monitored, managed and mildly protected against poaching, wildlife habitat destruction, indiscriminate burning of vegetation and grazing so as to shield these primates' species population against frequent attack from man. This will in turn help in the conservation of primates' species population in Old Oyo National Park buffer zone and in the park at large.

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