Journal of Research in Forestry, Wildlife & Environment Vol. 16(1) March, 2024
E-mail: *jrfwe2019@gmail.com; jfewr@yahoo.com*
http://www.ajol.info/index.php/jrfwe

ISBN: 2141 – 1778
Bukie et al., 2024

POPULATION ESTIMATE AND STRUCTURE OF PUTTY-NOSED GUENON IN AFI MOUNTAIN WILDLIFE SANCTUARY, NIGERIA

***Bukie J.O.[1&2] Ayanbem W. A.[2] Obwe J. O.[1] and Afolasade[1] M.O.[1]**

[1]Department of Wildlife and Range management, Joseph Sarwuen Tarka University (Federal University of Agriculture), Makurdi P.M.B.2373; Benue State Nigeria.
[2]Department of Forestry and Wildlife Resources Management, University of Calabar, Calabar Nigeria.
*Corresponding author: *bukie.james@uam.edu.ng* +234 703 952 9415

ABSTRACT

An estimate of Putty-nosed guenon's population density and structure was carried out in Afi Mountain Wildlife Sanctuary, Cross River State, Nigeria. The census was conducted to determine the population density and structure of Putty-nosed monkeys. Line transect method of data collection was used. Census was conducted in the two sectors of the sanctuary using Ten transects (1.0km length, 0.02km width) and spaced at an interval of 0.5km systematically. Direct method of animal sighting was employed. Population density of putty-nosed monkeys in the two sectors of Afi Mountain Wildlife Sanctuary was 5/km^2 and 2/km^2. However, the mean population density of putty-nosed monkeys in AMWS was ~ 4/km^2. This means that the population density is higher than previously reported for the monkey species in the study area implying that the population has increased over time. The variation of putty-nosed monkeys in the study area showed that the population structure is composed more of Juveniles than adult (27:26 and 13:1). The statistical test of significance between the Northern and Southern populations showed no significant difference. (T-tab = 0.482 < t-cal = 0.840 @ p = 0.05). It was therefore recommended that efforts through regular patrols by the rangers should be encouraged to protect the increasing population of guenons in the study area.

Keywords: Guenons, putty-nosed, Population, Structure, Line Transect, Afi Mountain, Cross River, Nigeria

Correct Citation of this Publication
Bukie J.O. Ayambem W. A.Obwe J. O. and Afolasade M.O. (2024). Population Estimate and Structure of Putty-Nosed Guenon in Afi Mountain Wildlife Sanctuary, Nigeria. *Journal of Research in Forestry, Wildlife & Environment,* 16(1): 34 - 39

INTRODUCTION

The rainforest of Cross River State is one of the richest in species diversity and endemism in the world, and it is home to endangered primates, such as the Cross River Gorilla (*Gorilla gorilla diehli*), the Drill monkey (*Mandrillus leucophaus*), and the Nigerian-Cameroon chimpanzee (*Pan troglodytes elliotii*) (Edet, 2011). The quality of a habitat can be determined by the presence or absence of certain species of wildlife (Eniang *et al.,* 2010). According to Bukie *et al., (*2016) Primates are important indicator species because; these species are visible, often threatened, and endangered, have great public appeal and can be sensitive indicators of low-level disturbance. Also according to Oates, 2011 (as cited in Bukie *et al.*, 2016), if there is a full complement of primate species present and at high population density then the forest habitat is providing the require resources and hunting is not excessive. However, if some species are missing or population densities are depressed, then adverse conditions are affecting primates and probably other wildlife species as well. The Putty-Nosed monkey, sometimes referred to as the Greater Spot-Nosed monkey, is a member of the Guenon family, and, as the name suggests, there are distinct due to the white or tan splotch

 on their nose. Putty-Nosed monkeys are in Western and Central Africa throughout densely forested regions. These monkeys are arboreal and use the heavy tree cover to hide from predators and to forage for food. They tend to be frugivorous but will supplement their diets with leaves, insects, nuts and seeds. Because of their love for fruits and seeds, they likely play a role in seed dispersal (Cronin *et al*., 2015). These primates generally live in groups of between 12 and 30 animals, led by one adult male who will breed with all of the adult females (Cronin *et al*., 2015). As with some other guenons, females will remain with their natal group for their entire lives, while adolescent males will leave their natal group and join another group for genetic diversity. The adult male is charged with finding food, protecting the females, and most importantly- signalling to the others when there is danger. They are often called "cowardly monkeys" due to their frequent alarm calls. One of the most notable things about Putty-Nosed monkeys (other than their powdered nose) is their communication structure. Putty-Nosed monkeys can be sympatric with other monkeys such as Diana monkeys (*Cercopithecus diana*) Mona Monkeys (*Cercopithecus mona*), Red-eared monkey (*Cercopithecus erythrotis*) and Drill monkey (*Mandrillus leucophaus*) meaning that they can overlap in territory with minimal conflict. Primatologists suspect that, despite competition for food, Diana monkeys (the more dominant of the two species) allow smaller Putty-Nosed groups to hang around for predator detection – especially crowned eagles, leopards or chimpanzees. There is evidence to suggest that Diana monkeys can meaningfully interpret some of the more distinct Putty-Nosed predator calls, and males from both species have been observed fending off crowned eagle attacks together (Ikemeh, 2013).

MATERIALS AND METHODS

Study Area

This study was carried out in Afi Mountain Wildlife Sanctuary, Cross river State, Nigeria. The study area lies geographically between Latitude 6°25’ and 6°30’ North and Longitude 8°45’ and 9°15’ East. The sanctuary is approximately 100km^2 in size and made up of rocks. It was created from the Afi River Forest Reserve in year 2000 following renewed international interest to protect the endangered Cross River Gorilla, Nigeria chimpanzee and the Drill Monkeys Figure 1.

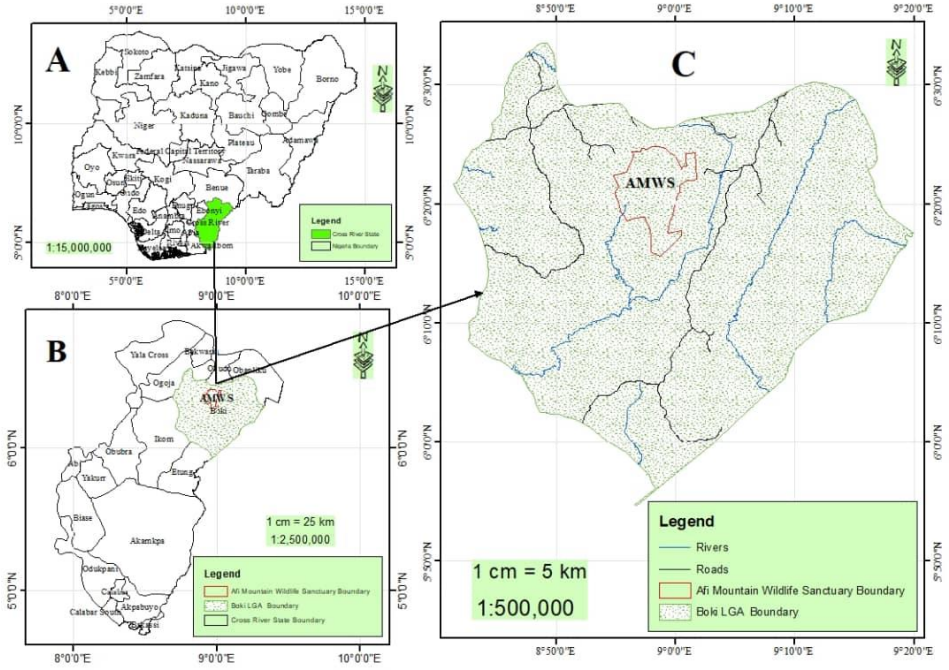

Figure 1: Map of the study area showing: A map of Nigeria, showing Cross River State; B map of Cross River State, showing Boki L.G.A. C map of Boki L.G.A., showing the study area; Afi Mountain Wildlife Sanctuary (AMWS)

Data Collection

The Line Transect method was used for the population density and structure of the putty-nosed monkey as used by Yager, (2018). Ten transects (five from each of the two blocks were mapped. Transect length of 1.0km and width of 0.02km and systematically spaced approximately 0.5km from each other in accordance with the guidelines of Peres, (1999). Distances along transects were marked with flagging tapes at intervals of 0.5km for easy identification of animal locations on transects. Each transect was covered by an observer and census was done simultaneously in all the ten transect, with the use of an electronic stop watch, which each observer had. This was done to reduce the incidence of double counting. The census started simultaneously at an agreed time, date and pace (1km/hr). During the census, each observer was equipped with a binocular for easy observation and field notebook to record the following information:

i. Transect number.
ii. Approximate right angle distance to the path of observation walked by observer.
iii. Approximate distance of observer to animal sighted.
iv. Number of putt-nosed monkeys sighted.
v. Population structure of the sighted animals

Using the information above, the population density of putty-nosed monkeys was determined using the formula:

$$D = \frac{N}{2LW} \quad \ldots\ldots\ldots\ldots (1)$$

Where: D = animal population density (Number/Km^2); N = number of animals sighted
L = Transect Length; W= Effective strip width
Ten (10) individuals conducted simultaneous surveys in the two blocks of Afi Mountain Wildlife Sanctuary in 2021. Rangers of Afi Mountain Wildlife Sanctuary were involved in the surveys.

Data Analysis

The student'-test (test of independent means) was used to test the results of putty-nosed Monkey population density and structure in the two selections. The test criterion is given as:

$$t = \frac{|x_1 - x_2|}{\sqrt{Sp^2\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} \ldots\ldots\ldots\ldots (2)$$

Where:
$x1$= Density of Northern site population
$x2$ = Density of Southern site population
Sp2 = Pooled variance
$n1$ = Frequency of sight in Northern population
$n2$ = Frequency of sight in Southern population
Pooled variance Sp2 = s

$$\text{Pooled variance } Sp^2 = \frac{\left[\sum X_1^2 \frac{(\sum X_1)^2}{n_1}\right]+\left[\sum X_2^2 \frac{(\sum X_2)^2}{n_2}\right]}{(n_1-1)+(n_2-1)} \ldots\ldots\ldots (3)$$

Or

$$\text{Pooled variance } Sp^2 = \frac{(n_1-1)S_1^2+(n_2-1)S_2^2}{(n_1-1)+(n_2-1)} \ldots\ldots\ldots (4)$$

Where:
$S_1^2 and\ S_2^2$ are variances for the first and second censuses respectively? The statement of hypothesis (in the null form) showed that there is no significant difference in the densities of the two censuses

RESULTS.

Population density of the putty-nosed monkeys in the study area:

The results of the Population density of putty-nosed monkey seen at different transects are presented in Table 1 and Table 2. Table 1 showed that, the Northern sector of Afi Mountain Wildlife Sanctuary (AMWS) had the highest population density. While table 2 showed that, the southern sector had the lowest population density of the study species.

The structure of putty-nosed monkey's population in the study area:

The results of the structure of putty-nosed monkey's population in the study area are presented in Tables 3 and 4.

Diversity Indices of Putty-nosed Monkey

The result of the diversity indices of putty-nosed monkey's population in the study area is presented in Table 5.

Table 1: Population Density of Putty-nosed monkeys in the Northern Sector.

Transect	Number Species	Number of Monkey sighted (N)	Area (Km^2)	Population Density (Number/Km^2)
T 1		0	11.8	0
T2		0	11.8	0
T3		26	11.8	2.20
T4		20	11.8	1.69
T5		10	11.8	0.85
Total		**56**	**59**	**4.74**

The population density in the northern sector is ~5/km^2

Table 2: Population Density of Putty-nosed in the Southern Sector.

Transect Number	Number of Monkey sighted (N)	Area (Km^2)	Population Density (Number/Km^2)
Boje Base Camp Transect (T1)	0	8.2	0
Buanchor Trail Transect (T2)	0	8.2	0
Katchie Transect (T3)	0	8.2	0
Pig Rock Transect (T4)	5	8.2	0.60
Udoja Cave Transect (T5)	9	8.2	1.10
Total	**14**	**41**	**1.70**

The population density in the southern sector is~2/km^2

Table 3: The structure of Putty-nosed monkey's population in the Northern Sector.

Measurements	Number of Monkey sighted	Mean	P-value
SEX			
Male	7	0.125	0.04
Female	49	0.821	0.96
AGE			
Infant	3	0.053	0.14
Juvenile	26	0.464	0.41^{ns}
Adult	27	0.482	0.45^{ns}

Table 4: The structure of Putty-nosed monkey's population in the Southern Sector.

Measurements	Number of Monkey sighted	Mean	P-value
SEX			
Male	1	0.072	0.05
Female	13	0.928	0.95
AGE			
Infant	0	0.0	0.00
Juvenile	13	0.929	0.95
Adult	1	0. 071	0.05

Table 5: Diversity Indices of putty-nosed monkey's population in AMWS.

Diversity Indices	North	South
Individuals	56	14
Dominance D	0.86	0.36
Simpson 1-D	0.64	0.14
Shannon H	1.12	0.26
Evenness **e^H/S**	0	0
Margalef	0	0
Berger-Parker	0.46	0.93

DISCUSSION

The population density of the putty-nosed monkeys reported in this study, 5/km^2 for the north and 2/km^2 for the south is similar to that of ~4/km^2 reported by Bukie (2015) in the same study area. The fact that the population density has not increased much over a seven-year period implies that hunting pressure is high Bukie (2024). Several other factors such as illegal logging, as also reported by (Bukie *et al.*, 2021) has led to the reduction in large trees species and possibly leading to a reduction in the food resources of the primates in the study area since primates rely mostly on fruit bearing trees. The species diversity in the study area, indicate that, a total number of 56 individual putty-nosed monkeys were encountered in Northern sector while total of 14 individual putty-nosed monkeys were encountered in the southern sector. The species diversity and richness was highest in the North (H=1.12, D=0.36) and lowest in the South (H=0.26, D=0.86). This was also similar to what was reported by Yager et al., (2018).

CONCLUSION

The population density of the Putty-nosed Monkeys in Afi Mountain Wildlife Sanctuary is 3.5/km^2 implying that this species population in the wildlife sanctuary has not increased significantly over the years due to anthropogenic activities. The mean population structure of the Putty-nosed Monkeys in the study area was predominated by juveniles, implying that there are growth potentials.

Recommendation

The following recommendations were made.

i. Regular population assessment of primates in the Afi Mountain Wildlife Sanctuary should be conducted to ascertain the population trend for effective management policies and conservation.
ii. There is need to carry out research on the nutritional requirements and biology of the putty-nosed monkey, to ascertain the survival possibility of the species.
iii. Government, NGOs and individuals should encourage research on the putty-nosed monkey through adequate logistics and financial support.

REFERENCES

Ajayi, S., Edet, D. I. and Bukie, J. O. (2011). Population Density of the White-Throated Monkey (*Cercopithecuserythrogaster*) in Okomu National Park, Edo State, Nigeria. *Journal of Agriculture, Forestry and the Social Sciences.* Vol. 9, No. 2, Pp. 175-182.

Bukie J. O., Nchor A. A., Ebu V. T., Mgbang E. U. (2016) Population Density of the Mona Monkeys (*Cercopithecusmona, Schreber, 1774*) in Afi Mountain Wildlife Sanctuary, Cross River State, Nigeria. *Agriculture, Forestry and Fisheries.* 5(6) 261-265.

Bukie, J. O. (2015). Some Aspects of the Population Ecology of Guenons in Afi Mountain Wildlife Sanctuary, Cross River State, Nigeria. Unpublished MSc. Thesis in the Department of Forestry and Wildlife Resources Management, University of Calabar 197Pp.

Bukie, J. O., Ebu, V. T. and Nchor, A. A. (2015) Population Ecology of the White-Throated Monkeys (*Cercopithecus erythrogaster*) in Afi Mountain Wildlife Sanctuary (AMWS), Cross River State, Nigeria. International Journal of Agriculture and Forestry, 5(4): 245-248

Bukie, J. O., Ityavyar, E. M and Inah, E. I. (2021). Illegal logging and its effects on the abundance and distribution of big tree species in afi mountain wildlife sanctuary, Cross River State Nigeria. Journal *of Research in Forestry, Wildlife & Environment,* 13(3): 68 – 74.

Bukie, J.O. (2024). Population and Feeding Ecology of Drill Monkeys (*Mandrillus leaucophaeus*) in Afi Mountain Wildlife Sanctuary, Cross River State Nigeria. Unpublished PhD dissertation, submitted to Post Graduate School, University of Calabar; Calabar Nigeria.

Cronin, D.T., Woloszynek, S., Morra, W.A., Honarvar, S., Linder, J.M., Gonder, M.K., O'Connor, M.P. and Hearn, G.W.

(2015). Long-term urban market dynamics reveal increased bush meat carcass volume despite economic growth and proactive environmental legislation on Bioko Island, Equatorial Guinea. *PLoSOne: e*0134464.

Edet, D. I. (2011). Biodiversity utilization in Afi Mountain Wildlife Sanctuary. PhD Dissertation, Department of Fisheries and Wildlife, University of Ibadan. Pp 356.

Eniang, E. A. and Egwali, E. C. (2010). Conservation of Ophidian species in Tropical Moist Forest Zone of AkwaIbom and Cross River State, Nigeria. In practical issues in Forest and Wildlife Resources Management. Ijeomah, H. M and Aiyeloja, A. A. (eds) Green Canopy Consultants, Choba, Port Harcourt, Nigeria. Pp 471-502.

Ikemeh, R.A. (2013) Status Survey to determine the population viability of the Nigerian-Cameroon Chimpanzee in the Nigerian Lowland Rainforests of SW Nigeria: Ise forest reserve and the Idanre forest cluster. A report to the Ondo and Ekiti State Governments, SW/Niger Delta Forest Project, Nigeria.

Linder, J.M. and Oates, J.F. (2011). Differential impact of bush meat hunting on monkey species and implications for primate conservation in Korup National Park, Cameroon. *Biological Conservation* 144: 738-745.

Oates, J. F. (2011). Primates of West Africa. A field guide and Natural History. PanamericanaFormase impress, S. A., Bogota, Columbia. Pp.154-334.

Peres, C. A. (1999). General Guidelines for standardizing line-transect surveys of Tropical Forest Primates. Neotropical primates 7 (1): 11-16.

Yager, G. O. Bukie J.O. and Kaa, A. E (2018) Assessment of Population Density and Structure of Primates in Pandam Wildlife Park, Plateau State, Nigeria Sustainability, Agri, Food and Environmental Research, 6(2): 18-35