NESTING ECOLOGY OF GORILLAS IN AFI MOUNTAIN WILDLIFE SANCTUARY, BOKI, CROSS RIVER STATE, NIGERIA

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ABSTRACT

Nesting behaviour of gorillas was studied in the Afi Sanctuary to determine the locations, heights and sizes of their nests. This was done by following transect routes and trails of animals which had already been created by both human and animal activities. The distances were labeled with flagging by the protection staff with reference to cardinal points. The sampling technique adopted was stratified random sampling done by the survey of 30 transect routes in which accessibility was not made impossible by terrain. The transect length covered a distance of 2000m and a width of 100m which formed a total sample area of $6km^2$ representing a sampling intensity of 6% of a total area of 100 km^2. Nests census was carried out by counting the nests of gorillas constructed both on the ground and lower branches of trees. Nests sizes were measured by meter tape. Trees and nests heights were determined by the use of sunto clinometer. The number of nests studied for nesting locations and heights was 145 while 30 nests was studied for nests sizes. Data analysis was carried out using means, variance, standard deviation as well as correlation analysis. The result revealed that the highest number of 63 nests representing 43.45% were made on the ground, followed by vertical fork with 32 nests representing 22.06% . Vine tangle recorded 19 nests representing 13.10%. The horizontal fork recorded 12(8.28%). Tree platform accounted for 11 nests representing 7.59% . Rock platform, however, had the least frequency of 8 nests (5.51%). Nests heights distribution showed that heights interval 0 – 1m recorded the highest frequency of 71 (48.97%), followed by heights interval 4 - 5 and 6 – 7m with frequency of 19 (13.1%). The heights interval 10 – 11m and 12 – 13 recorded a frequency of 8 (5.06%) each, whereas, heights interval 14 – 15m recorded frequency of 7 (4.43%). However, the heights interval 2 – 3 recorded a frequency and percentage of zero. The mean nests height, X, was 4.3m. Variance , S^2 of nests heights was 42. Standard deviation, S, of nests heights was 6.4 and the standard error, S_E, of the mean of nests heights was 0.91. The highest nest size of gorillas out of the 30 nests measured was $3.74m^2$, followed by $3.68m^2$ and $3.58m^2$. The lowest nest size was $1.92m^2$, followed by $2.17m^2$ and $2.39m^2$ with a mean nests size, X , of 2.96m.

Keywords: Nesting, Ecology , Gorillas, Afi Mountain, Wildlife Sanctuary

1 INTRODUCTION

Gorillas are the largest ground-dwelling primate in Africa, and inhabit the forests of West and Central Africa. Gorillas are divided into two species and four subspecies. The DNA of gorillas is highly similar to that of human, and they are the next closest living relatives to humans after the two chimpanzees species. The natural habitats of gorillas cover tropical or subtropical forests in Africa. Their range covers a small percentage of Africa, but spans a wide range of elevations. The Mountain gorilla is an inhabitant of the Albertine Rift Montane Cloud forests of the Volcanoes, ranging in altitude from 2,200–4,300 m [8], [13]. Lowland Gorillas live in dense forests and lowland swamps and marshes as low as sea level, with Western Lowland Gorillas living in Central West African countries and Eastern Lowland Gorillas living in the Democratic Republic of Congo near its border with Rwanda. Gorilla populations are classified as: Western gorillas, *Gorilla gorilla* comprising Western lowland gorilla, *Gorilla gorilla gorilla,* and Cross River gorilla, *Gorilla gorilla diehli;* and Eastern gorillas, *Gorilla beringei* comprising Mountain gorilla, *Gorilla beringei beringei* and Eastern Lowland gorilla, *Gorilla beringei graueri* [8],[13]. Some variations that distinguish the classifications of gorilla include varying density, size, hair color, length, culture, and facial widths [8]. They were thought to be over 100,000 Western Lowland Gorillas in the wild, with 4,000 in zoos; Eastern Lowland Gorillas have a population of 4,000 in the wild and 24 in zoos but mountain gorillas were severely endangered, with an estimated population of about 620 left in the wild and none in zoos [8] and are even critically endangered of recent [7] thereby losing its value to the ecosystem with regards to man [17].

Gorillas knuckle walk in their movement. They sometimes move bipedally for short distances while carrying food or in defensive situations.

According to Kingdon [8] adult males range in height 1.65–1.75 metres, and in weight 140–200 kg while adult females are often half the size of a silverback male, averaging about 1.4 metres tall and 100 kg in weight. The Cross River gorilla is a huge dark body primate compared to chimpanzee. It has a black face with a compact body build; longer arm compared to the hind limbs. It is robust and powerful, with strong chest and a protruding abdomen; the hair is black while the face has large nostrils, small ears, and prominent brow ridges. The black face and body is nature's cryptic colouration to the animal to remain hidden in thick vegetation and gaps between standing rocks as well as rock boulders. For instance, a tourist on this mountain was tracking gorilla unwary that they were hidden in nearby vegetation until when the animal made a sudden threatening shout that the man fled for fear to safety while losing his camera and other items. The long and muscular arm enhances the strength and vigour of the animal for defence of group and territory so as to perpetuate themselves through propagation of viable population. Adult gorillas have long, muscular arms that are 15–20 percent longer than the stocky legs; males are about twice as heavy as females and may attain a height of about 1.7 m and a weight of 135–220 kg in the wild [6]. The objectives of this study was to determine the locations, heights and sizes of nests of gorillas in this study area.

2 SURVEY AND SAMPLING TECHNIQUES

The line transect survey method used by several researchers on their study of mammals especially primates in Africa was adopted for this study considering the nature of mammalian species and rugged topographic terrain of the study area [2],[1],[15],[11],10],[3],[4],[5],[9],[12]. This was done by following transect routes and trails of animals which had already

been created by both humans and animal activities. The distances were labeled with flagging by the protection staff with reference to cardinal points. The sampling technique adopted was stratified random sampling done by the survey of 30 transect routes in which accessibility was not made impossible by terrain. The transect length covered a distance of 2000m and a width of 100m which formed a total sample area of $6km^2$ representing a sampling intensity of 6% of a total area of 100 km^2. Nests census was carried out by counting the nests of gorillas constructed both on the ground and lower branches of trees. Nests sizes were measured by meter tape. Trees and nests heights were determined by the use of sunto clinometers. The number of nests studied for nesting locations and heights was 145 while 30 nests built on ground and lower branches were studied for nests sizes.

3 METHOD OF DATA ANALYSIS

The sample mean, x, of chimps nests data was obtained by dividing sum of all values by the sampling frequency.

$$\overline{x} \quad = \quad \Sigma x / \Sigma n$$

Variance, S^2, of chimps and gorillas nests data was obtained by the following formula:

$$S^2 = \sum x^2 - \frac{(\sum x)^2}{n} \Big/ (n-1)$$

The standard deviation of the chimps and gorillas nests data set was calculated according to Wahua [16] by:

Standard deviation,

$$S = \sqrt{ \sum x^2 \quad \frac{(\sum x)^2}{n} \Big/ (n-1) }$$

The sizes of nests were calculated by the formula: $\prod r^2$ or $\prod D$, where $\prod$ = 3.142; r = radius; and D = diameter.

4 RESULTS

4.1 Locations of Nests of Gorillas in Trees

Table 1 below reveals that the highest number of 63 nests representing 43.45% were made on the ground, followed by vertical fork with 32 nests representing 22.06% . Vine tangle recorded 19 nests representing 13.10%. The horizontal fork recorded 12(8.28%). Tree platform accounted for 11 nests representing 7.59% . Rock platform, however, had the least frequency of 8 nests (5.51%). The high proportion of gorillas nests constructed on the ground occurred because gorillas prefer ground nests in grassy or herbage patch when presented with a choice in a mosaic of forest and grass or herb patches probably to enjoy the comfort of not climbing due to their body weights as well as the absence of a common predator of their young such as leopard in this ecosystem.

4.2 Distribution of Nests Heights of Gorillas in the Study Area

Table 2 below indicates that heights interval 0 – 1m recorded the highest frequency of 71 (48.97%), followed by heights interval 4 - 5 and 6 – 7m with frequency of 19 (13.1%). The heights interval 10 – 11m and 12 – 13 recorded a frequency of 8 (5.06%) each, whereas, heights interval 14 – 15m recorded frequency of 7 (4.43%). However, the heights interval 2 – 3 recorded a frequency and percentage of zero. The result means that gorillas prefer nests making at ground level and lower branches of trees because of their huge and

compact body weights to avoid the difficulty of climbing and ensure comfort of rest and sleep. Since they are mega omnivores, the adult do not have predators in their ecosystems while the juveniles make their nests in the trees for the night rest.

4.3 Nests Heights and sizes of Gorillas in the Afi Sanctuar

The mean nests height, $\bar{X}$, was 4.3m. Variance , $S,^2$ of nests heights was 42. Standard deviation, S, of nests heights was 6.4 and the standard error, S_E, of the mean of nests heights was 0.91. The highest nest size of gorillas out of the 30 nests measured was 3.74m^2, followed by 3.68m^2 and 3.58m^2. The lowest nest size was 1.92m^2, followed by 2.17m^2 and 2.39m^2 with a mean nests size, X, of 2.96m^2 as shown table 4 below. The variation in the sizes of nests of gorillas observed here was probably due mostly to the sizes of the animals since there was availability of nesting materials for the animals to have increased the nests as large as desired. Therefore, nests sizes was highly dependent on body sizes and weights.
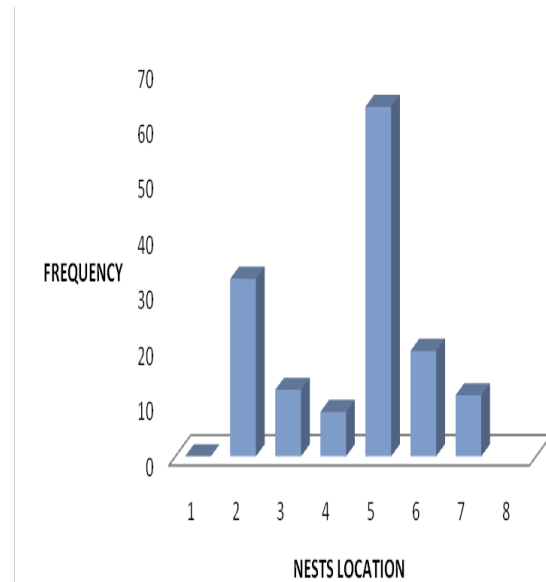

Fig 1: Nesting Locations of Gorillas in Afi Mountain Wildlife Sanctuary, Boki, Cross River State, Nigeria.
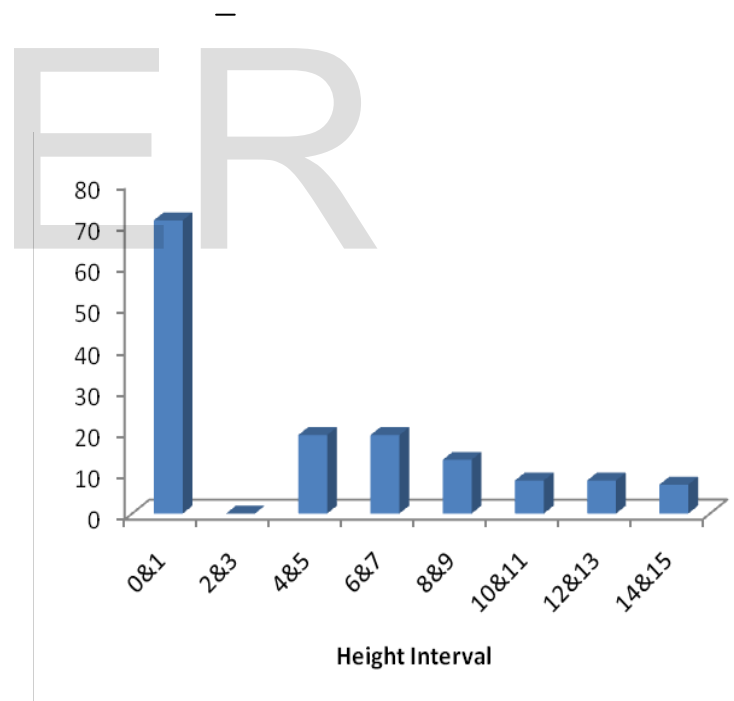

Fig 2: Height Distribution of Nests of Gorillas in Afi Mountain Wildlife Sanctuary, Boki, Cross River State, Nigeria.

Table 3: **The Mean and Standard Deviation of Nests Heights of gorillas**

S/N	Statistics	Value
1	Mean , X,	4.3
2	Variance ,S^2,	42
3	Standard	
4	deviation ,S,	6.4
	Standard error ,S_E,	0.91

Table 4 : Nest Size of Gorillas in the Study Area

S/N	Nests Sizes	S/N	Nests Sizes	S/N	Nests Sizes
1	2.92	11	2.98	21	3.30
2	2.67	12	2.64	22	3.17
3	2.83	13	2.73	23	3.14
4	3.46	14	2.86	24	2.39
5	3.30	15	2.48	25	2.58
6	3.39	16	2.51	26	2.17
7	3.58	17	2.67	27	3.08
8	2.51	18	3.68	28	2.89
9	2.76	19	3.36	29	1.92
10	3.11	20	3.74	30	3.20

CONLUSION AND RECOMMENDATION

Gorillas forage on the ground and range widely in the day time in their ecosystems. At night, the juveniles and young adults require trees for nest building and sleeping to be able to fit into the activities of the next day. The function of trees in this regard cannot be overemphasized. Trees are very critical for gorillas night rest. Therefore, the protection and management of trees in such ecosystems both for the gorillas as well as protection of the natural environment is highly recommended.

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