

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

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**ABSTRACT:** The nesting behavior of chimpanzees in Afi Sanctuary was studied to find out their nests locations and heights. The line transect survey method was used in this study. This was done by following transect routes and trails of animals. 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<sup>2</sup> representing a sampling intensity of 6% of a total area of 100 km<sup>2</sup>. Ten surveys were carried out in all. Nests census was carried out by counting nests while nesting behaviour was studied by the use of binoculars to observe the nests sizes, shapes, and materials since nests of chimpanzees are usually built at heights above the ground surface. Trees and nests heights were determined by the use of sunto clinometer. The number of nest studied for nesting location and heights was 64 while 30 was for nests sizes. The mean nests heights,  $\bar{X}$ , was 19.26m. The Variance,  $S^2$ , of nests heights was 55. The Standard deviation,  $S$ , of nests heights was 7.4; while the Standard error of the mean,  $SE$ , of nests heights was 0.92. 41 nests representing 64.06% were built between vertical trees forks; 11(17.18%) nests were built between horizontal trees forks; while 8 (12.50%) and 4 (6.25%) nests were made on trees platforms as well as vine tangles respectively. Trees were critical for chimps night rest and critically recommended for protection and management.

**Keywords:** Nesting, Ecology, Chimpanzees, Afi Mountain, Wildlife Sanctuary

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## 1 INTRODUCTION

The robust or common chimpanzee (*Pan troglodytes*, Blumenbach, 1779) is often colloquially called the chimpanzee (or simply chimp). But technically this term refers to both species in the genus *Pan*: the common chimpanzee and Bonobo or pygmy chimpanzee *Pan paniscus*. The common chimpanzee, *Pan troglodytes*, is a great ape. Recent DNA evidence suggests that the Bonobo and common chimpanzee species diverged from each others line less than one million years ago [18],[6]. Four subspecies of the common chimpanzee have been identified and recognized, viz:

Central African Chimpanzee, *Pan troglodytes troglodytes*; Western African Chimpanzee, *Pan troglodytes verus*; Nigeria -Cameroon chimpanzee, *Pan troglodytes vellerosus*; and Eastern African chimpanzee, *Pan troglodytes schweinfurthii*. Chimps can be found in 22 African countries. Common chimpanzees live in the tropical forests and guinea savanna, bamboo forests, swamps and even open savannas of Africa [18]. Their habitats have been drastically reduced by forest fragmentation.

Adults in the wild weigh between 40 and 65kg; males measure up to 160cm and females 130cm. Although lighter than

humans they are five to six times stronger because their muscle are far stronger [8]. They are omnivorous in dietary habit. The chimpanzee is the most anthropoid or human like ape. Early evolutionists believed that the chimp is the closest relative of the human which genetically separated some millions of years ago. Chimpanzees are terrestrial and arboreal. They normally walk on all four limbs, but can walk and run on the hind limbs for short distances. In trees, their strong arms allow them to swing and clamber through the branches. At night, they make nests in trees by collecting twigs and branches to form a simple platform. Each nest is normally used for only one night [8]. Generally, chimpanzees are friendly and unaggressive to each other [6]. They have a wide range of vocal sounds, postures, expressions and activities which indicate mood and convey information between individuals and groups [18]. Chimpanzees are probably the most intelligent of all the primates other than man [14]. These make chimpanzees more closely related to man than other primates.

Chimpanzees are lively animals with more extroverted dispositions than either gorillas or orangutans. They are highly social and live in loose and flexible groups known as communities, or unit groups, that are based on associations between adult males within a home range or territory [5]. Home ranges of forest-dwelling communities can be as small as a few square kilometres, but home ranges covering hundreds of square kilometres are known among savanna communities [18]. A community can number from 20 or fewer to well over 100 members, each consisting of several subgroups of varying size and unstable composition with adult males being dominant over adult females and adolescent males. Within a community, there are twice or three times as many adult females as adult males and communities usually divide into subgroups called parties, which vary widely in sizes

[6]. The dominant male or alpha male of a group can monopolize ovulating females through possessive behaviour while gang attack by subordinate males can expel an alpha male [8]. Chimps exhibit hostile behavior between different chimp communities. Adult males engage in boundary patrol and attack intruders within their home range. Cannibalism on infants by adult males, and to a lesser extent by adult females, especially on infants of neighbouring groups and newly immigrated females had been observed [14]. They share psychological emotions similar to those found in humans which are consoling, reconciling, and retaliating in fighting as well as self-recognition, curiosity, sympathy, and attribution [8]. Chimps take care of orphaned infants, tease handicapped individuals, conceal information that would bring disadvantage to themselves, and manipulate others to their own advantage by expressing deceptive postures, gestures, and facial expressions [8]. Chimpanzees give birth to one young after gestation of about 8 months and there is a strong bond between mother and infant. Maturity is attained in 7-9 years, and the lifespan may be at least 30 years.

The species of chimpanzees found here is called the Nigeria-Cameroon chimpanzees, *Pan troglodytes vellerosus* [11]. They have a dark brown to black body colour. The adults has a masked face with reddish brown facial colour or a dark mask around the eyes. The red face helps members of their groups to identify each other, while their dark fur aids the chimps to be hidden in the trees or bushes when the animals want to evade sighting by predators like the leopard and human enemies [8], [18]. This is a serious disadvantage to researchers and tourists who want to watch these species in their natural environment to satisfy certain knowledge, curiosity and aesthetics as they find it rather difficult catching a glimpse of

these species. Chimps walk quadrupedally with their fore and hind limbs. Walking or running with four limbs enhances stability and speed [8], [14] but their weight and size prevent them from being as agile as the small forest monkeys called guenons. The chimps are endangered in their habitats [9]. Keele *et al.*, [10], Reeves and Doms, [15] reported that chimpanzees are reservoirs of Pandemic and Non pandemic HIV.

The objectives of this research, therefore, included: to study chimps' nesting locations and heights in the Afi Mountain Wildlife Sanctuary.

## 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 terrain of the study area [3], [2], [16], [4], [7], [12], [1], [6], [13]. 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 transect routes in which accessibility was not made impossible by terrain. This technique was adopted in order to have representative coverage of the entire home range of the species to make discovery of their nests sites possible. The survey of 30 transect routes with a length of 2000m and a width of 100m which formed a total sample area of 6km<sup>2</sup> representing a sampling intensity of

6% of a total area of 100 km<sup>2</sup> was carried out.

Nests census was carried out by counting the number of nests while nesting behaviour was studied by the use of binoculars to observe and determine the nests sizes, shapes, and materials since nests of chimpanzees are usually built at heights above the ground surface. Trees and nests heights were determined by the use of sunto clinometer. The number of nests studied for nesting locations and heights was 64 while 30 nests were studied for nests sizes.

## 3 METHOD OF DATA ANALYSIS

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

$$\bar{x} = \frac{\sum x}{\sum n}$$

Variance,  $S^2$ , of chimps nests data was obtained by the

following formula:

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

The standard deviation of the chimps nests data set was calculated by [17]:

Standard deviation,

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

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

Correlation Analysis between nests heights and trees heights on which nests of

chimpanzees were built was calculated using the following formula [17] :

Correlation analysis,

$$r = \frac{\sum xy}{\sqrt{\sum x^2 \cdot \sum y^2}}$$

The materials used in the research were: Binoculars, photo camera, field note book, field guide, field manual, sleeping tent and pad, cutlass, sunto clinometer.

## 4 RESULTS AND DISCUSSION

### 4.1 Nesting Locations of Chimpanzees in Trees on the Study Area

Figure 1 below shows that 41 nests representing 64.06% were built between vertical trees forks; 11(17.18%) nests were built between horizontal trees forks; while 8 (12.50%) and 4 (6.25%) nests were made on trees platforms (broad flat branches) as well as vine tangles respectively. The vertical fork provided enormous support and protection to adequately anchor chimps nests as well as the chimps while resting and sleeping during the nights hours more than any other nests building locations. The chimps, therefore, by their intelligence and high sense of security have high preference for the vertical spaces between trees branches to construct nests each nights. Most adults because of their heavier weights colonize such trees location. Some more agile younger animals make use of horizontal fork, platform and vine tangles. These ‘nests’ were thick bedding materials

comprising tree branches or tree forks, twigs, leaves, tangles as well as vines. The shape of nests was generally round or oval while some were irregular. Their nests were built high up in the trees canopy depending on the availability of building materials and the height of trees. The average area of each nests site was about a quarter of an hectare depending on the number of individuals in the group and the availability of trees at the sites.

### 4.2 Distribution of Heights of Nests of Chimpanzees in the Study Area

Fig 2 below shows that the highest frequency of height distribution of 15 representing 23.44% was recorded for heights interval 21-25, followed by heights interval 11-15 with a heights distribution frequency of 14 representing 21.88%. The heights interval 16-20 recorded a heights distribution frequency of 8 representing 12.50%. Heights intervals 6-10 and 31-35 recorded a heights distribution frequency of 7 each representing 10.94%. Heights intervals 26-30 and 36-40 recorded a heights distribution frequencies of 5(7.81%) and 1(1.56%) respectively, while heights intervals 0-5 and 41-45 recorded a heights distribution frequency of 0 each. Nests heights ranged from 6m to the top of trees. No nests of chimps were built on the ground as compared to gorilla nests which many were built on the ground and lower branches. The distribution of heights of nests of chimpanzees was influenced by the distribution of vertical and horizontal forks, as well as platforms and vine clusters where chimps built their nest. Sites for

nests building were, therefore, more available between 21m and 25m as well as between 11m and 15m compared to other heights intervals. These heights corresponded to the heights of crowns of trees where these animals considered having much safety to make their nests.

#### 4.3 The Mean and Standard Deviation of Nests Heights of Chimpanzees

The mean nests heights  $\bar{X}$ , was 19.26m. The Variance,  $S^2$ , of nests heights was 55. The Standard deviation  $S$ , of nests heights was 7.4; while the Standard error of the mean,  $S_E$ , of nests heights was 0.92, as shown in table 3 below

#### 4.4 Hypothesis on Nests Heights of Chimpanzees

**Ho:** There was no linear correlation between nests heights and trees heights on which nests of chimps were built.

**Ha:** There was linear correlation between nests heights and trees heights on which nests of chimps were built.

Correlation ( $r$ ) analysis was calculated for chimps nests heights and trees heights on which chimps' nests were built and the results are as stated in table 1 below.

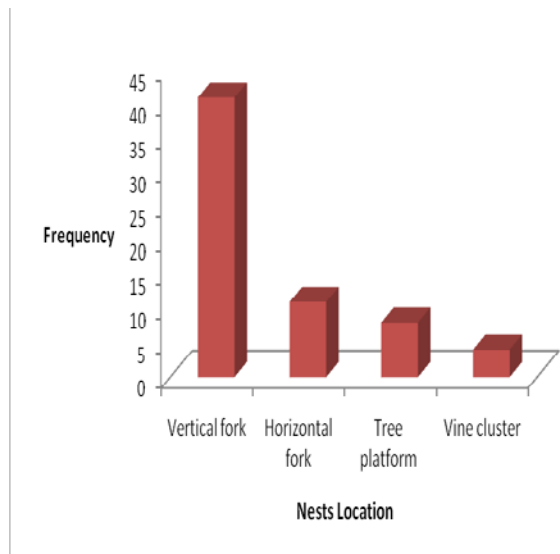
Since the calculated  $r$  was greater than the expected  $r$ , the  $H_0$  was therefore rejected while  $H_a$  was accepted and concluded that there existed a linear correlation between chimps nests heights and trees heights. This means that the higher the heights of trees in the areas where nests were built, the higher the heights of chimps nests until the natural limit of trees heights in the area was reached, and vice versa. This is because the

chimps have agile body sizes and weights which permit them to climb and swing through trees branches at will to secure locations high up trees for protection from common enemies.

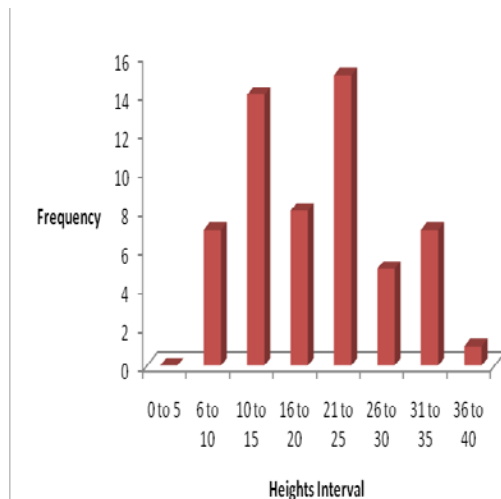
Chimpanzees built their nests each night for the night rest after foraging indicated by the series of group nests observed. They build nests every night because they do not return daily to the same nests sites as birds do. But they keep on moving from one location to another along their trails in order to fully exploit their home range. Nature has provided that no small area or territory can fully satisfy the demands of this animal for a longer period of time, otherwise the carrying capacity of such area of ecosystem would be exceeded resulting in serious damage to the ecosystem such as over-foraging, loss of biodiversity, soil compaction, erosion and siltation of water bodies. Also, this animal cannot play its role as keystone species in the ecosystem without ranging all through the entire ecosystem at the appropriate regime.

Chimpanzees foraged, moved, rested, nested and slept in groups. Their group life enhances mutual security, sourcing for food, locating bearing and direction, and defence of territory. Nesting evidence showed the presence of up to three groups which break-up and re-unite depending on social hierarchy or peck order whereby subordinate individuals become disloyal to the leadership of the alpha male leading to division and break-up of the group. Also, environmental conditions such as food availability and trees' density which hosts the nests they build daily influence their distribution. Hence, chimps are highly social animals. Goodall [8] after studying chimpanzees in the rainforests of Central Africa reported

that the common chimpanzee lives in a fission-fusion society in which portions of the parent group regularly separate from and rejoin the rest.



**Fig 1: Nesting Locations of Chimpanzees on Trees**



**Fig 2: Distribution of Heights of Nests of Chimpanzees**

**Table 1: The Mean and Standard Deviation of Nests Heights of Chimpanzees**

S/N	Statistics	Value
1	Mean , $\bar{X}$ ,	19.26
2	Variance , $S^2$ ,	55
3	Standard deviation, $S$ ,	7.4
4	Standard error , $S_E$ ,	0.92
5	Calculated, $r$	0.46
6	Expected $r_{(0.05)}$	0.36

**5 CONCLUSION AND**

**RECOMMENDATION**

Chimpanzees mostly forage on the ground and range widely in the day time in their ecosystems. But at night they require trees for nest building and sleeping to be able to fit into the next day activities. The function of trees in this regard cannot be overemphasized. Trees are very critical for chimps' night rest. Therefore, the protection and management of trees in the chimps' ecosystem is highly recommended.

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