

## Status survey of chimpanzee *Pan troglodytes* in the forest zone of southwestern Nigeria

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**Abstract** The status and distribution of chimpanzee *Pan troglodytes* populations were investigated in the humid forest of southwestern Nigeria. Fifteen forest reserves totaling 2 443.58 km<sup>2</sup> were identified to harbor the animal in the region, and eight of these, with a total area of 1 920.48 km<sup>2</sup> were surveyed. The density of chimpanzees was greater than 0.20 km<sup>-2</sup> in only two forest reserves: Eba Forest Reserve and Ise Forest Reserve. Numbers of nests sighted were observed to be above ten in four of the reserves: Akure/Ofosu Forest Reserve 13, Oluwa Forest Reserve 11, Ise Forest Reserve 22 and Ago-Owu Forest Reserve 11. Other signs of chimpanzee presence, such as direct sightings, vocalizations, feeding signs and feces were more frequent in the Ise Forest Reserve. These results suggest that remnant manageable populations of chimpanzees still exist in the region and that there is the need to initiate conservation policies that will guarantee their continued existence in Southwestern Nigeria [Acta Zoologica Sinica 52 (6): 1009–1014, 2006].

**Key words** Chimpanzees, Distribution, Forest zone, Remnant manageable population

## 尼日利亚西南部森林区域中黑猩猩的状况调查

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**摘要** 我们利用标准化调查和广泛调查两种方法对尼日利亚西南部森林中黑猩猩 (*Pan troglodytes*) 的分布状态进行了调查。本研究确认该地区总计2 443.58 km<sup>2</sup>的15个森林保护区内存在该物种。然而基于间接证据,该地区之前仅有8个森林保护区共计1 920.48 km<sup>2</sup>被调查过。我们将独立收集的年度数据根据不同保护区进行分类总结并且估计了建巢黑猩猩的个体密度。研究结果显示该地区的黑猩猩呈低密度高分散分布,其中只有Eba和Ise两个森林保护区中黑猩猩的分布密度显著大于0.20/km<sup>2</sup>。研究区域内四个森林保护区中黑猩猩的建巢数大于10(Akure/Ofosu森林保护区,13个;Oluwa森林保护区,11个;Ise森林保护区22个;Ago-Owu森林保护区,11个)。此外,在Ise森林保护区内我们观察到黑猩猩其它活动(例如观望行为,发声行为,取食迹象和粪便)的频次显著高于其它森林保护区。研究结果表明,残余且易于管理的黑猩猩种群分布于该调查区域。建议采取适当的保护措施来保证它们的继续生存[动物学报52(6):1009–1014,2006]。

**关键词** 黑猩猩分布 森林区 残余的可管理种群

All chimpanzee subspecies are listed in the IUCN Red List of Threatened Species as Endangered. The western chimpanzee *Pan troglodytes verus* and the Nigerian chimpanzee *Pan troglodytes vellerosus* are however the most threatened. Conservation efforts to

protect them in their natural habitat are of the highest priority. Gonder et al. (2006) state that it is not yet known where the geographic divisions occur between these two taxa of west African chimpanzees or whether chimpanzees in western Nigeria form a dis-

tinct genetic population. Indeed, a number of studies report that remnant populations of chimpanzee exist in discrete locations in the humid forests of Southwestern Nigeria (e.g., Agbelusi, 1994; Gonder et al., 1997; Persson and Warner, 2003). The extent and distribution of these populations remain unknown.

Chimpanzees prefer undisrupted primary rainforest and wet savanna woodland which are now becoming very rare in Nigeria. Agbelusi et al. (2003) reported a transient population of chimpanzees in Okomu National Park, Edo State, Nigeria. The park is regarded as the only hope for long-term survival of the tropical rainforest and its associated fauna in the region. Persson and Warner (2003) recorded an encounter with a group of seven chimpanzees in a preliminary survey in Omo Forest Reserve, Ogun State, Nigeria. Ogunjemite et al. (2005) also reported that the apes utilize regenerated forest areas in the commercially exploited forest reserve of Ise, Ekiti State, Nigeria where sufficient resources for foraging and nesting exist.

Conserving chimpanzee populations is also important in Southwest Nigeria because of the importance of the region in chimpanzee evolution (Gonder and Disotell, 2006). However, the status and the distribution of chimpanzees in western Nigeria remains unclear. Thus, the purpose of this study was to provide more detailed information concerning the status and the distribution of chimpanzees in western Nigeria, as a prerequisite for making informed conservation decisions.

## 1 Study area and methods

### 1.1 Study area

The study was undertaken in fifteen forest reserves in the states of Ondo, Ekiti and Osun in Southwestern Nigeria. These states still maintain substantial forest reservations. Policies associated with the development of forestry and wildlife management have always been similar in these states. There are some of the forest reserves that are contiguous with one another along the boundaries of the states. The region lies within Latitude 6° and 8° North of the equator and Longitude 4° and 6° East of the Greenwich Meridian.

The costal areas are dominated by a low-lying plain of alluvial sedimentary rock and do not rise beyond 50 m above sea level. The hinterland (where this project was conducted) is made up of basement rock with many outcrops of granite material covered with mantles of dense vegetation of primary and secondary rainforest. Such activities which affect the status of these forests include logging, encroachment through farming, settlements, road construction and

occurrence of wildfire (Adeofun, 1999).

The climate is characterized by a dry season of about 3 – 4 months usually between November and February. Wettest periods are usually in July and September characterized by double maximal rainfall. Annual rainfall within the region ranges between 1 500 mm to 2 500 mm depending on the distance from the coast. Over 70 percent of the population in the region is rural and therefore heavily dependant on forest products for subsistence.

### 1.2 Methods of data collection

Observational studies are very difficult to carry out on unhabituated chimpanzees. In such situations, the animals are best studied by means of indices they leave behind and through information obtained from hunters and other contacts (Forest guards and loggers) with the animals. Face-to-face structured interviews were carried out with hunters, forest guards, loggers and community leaders to ascertain the presence or absence of chimpanzee in their communities.

The broad survey method (Scott et al., 1976) was further employed in our sampling to determine if there was substantial evidence of chimpanzees in eight of the reserves (Fig. 1). The method attempt to cover large geographical areas in a relatively short time. Existing trails were used as transects. Chimpanzee tracking was carried out only during the dry seasons. Limited time and funds prevented surveying each reserve in single season. However, all reserves that are contiguous with or close to one another were surveyed in one season; thus the Okeluse, Akure/Ofosu and Idanre Forest Reserves were surveyed in the dry season (Jan./Feb.) 2004; Oluwa, Shasha and Ago-Owu with Eba Forest Reserves were surveyed in Jan./Feb. 2005. However, continuous monitoring of chimpanzees in Ise Forest Reserve, Ondo State was carried out between 2000 and 2004. Only the data collected during the dry season in 2003/2004 (Dec. – Feb.) are reported here.

Surveys involved walking between 3.5 – 15 km of transect in each of the forest reserves, searching for signs of chimpanzee activity (the most important of which is its nest). Between two to five transects (usually hunters trails) were traversed once. Transect length and bearing were established by pacing and by using a compass. Information collected from the transect lines included, number of nests within a 30 m strip on each side of the transect), locations of nest habitat types, evidence of chimpanzee feeding, and presence of feces. Nests were located with the assistance of guides (hunters) who know the forests intimately. Between three to five working days were spent in a reserve depending upon its size and the cooperation of guides.

Data were collected independently on a yearly

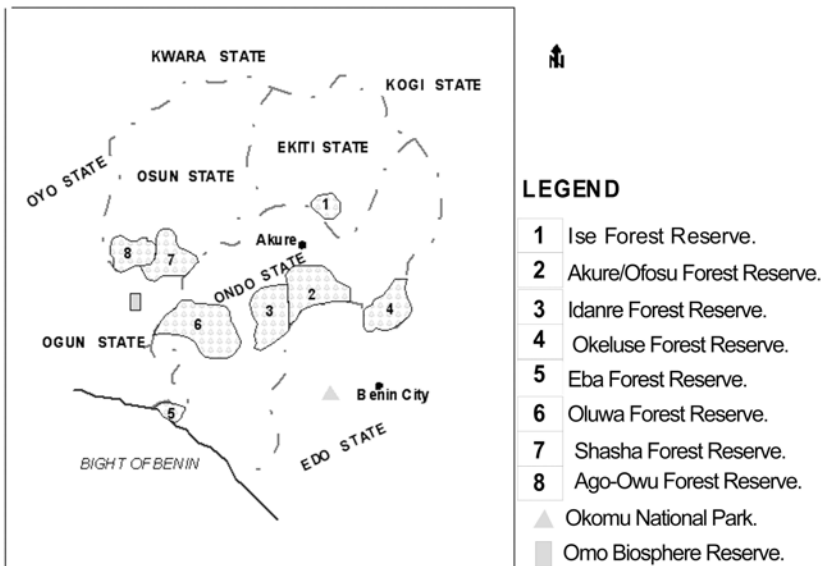
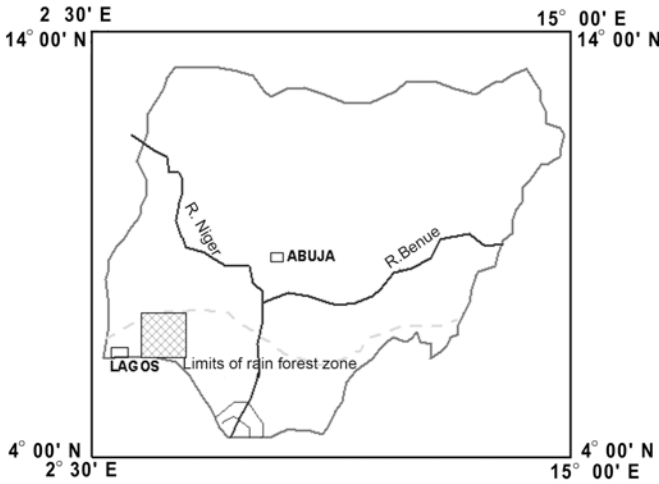


Fig.1: Chimpanzee Range within South West Nigeria.

Fig.1 Champanzee range within southwest Nigeria

basis. All data were summarized according to location. Descriptive methods were used to analyze the survey data. The densities of nest building individuals were estimated using a modification of Tutin and Fernandez (1984) equation as follows:

$$\text{Density} = \frac{\text{No. of nest counted}}{\text{Area sampled}} \times \frac{1}{\text{Nest disintegration days}}$$

Following Ihobe\*, Ogunjemite (2004) obtained 81 days nest disintegration day for 26 independent nests monitored from the first day of construction in Ise Forest Reserve. This value was used in the formula above. Terminal disintegration date was defined as when all leaves had been removed from twigs used to build the nest.

We did not attempt to calculate total numbers of chimpanzees in each reserve, since it is not possible to

do so based upon nest-counts made in relatively small areas.

## 2 Results

Fifteen forest reserves with total area of 2 443.58 km<sup>2</sup> were found to contain chimpanzees in southwestern Nigeria (Table 1). Eba is the only reserve that includes a swampy area. Eight reserves: Akure/Ofosu, Ala, Ise, Idanre, Okeluse, Oluwa, Onisere and Shasha are within moist lowland rain forest. Four other reserves (Owo, Ago-Owu, Eti-Oni and Ogotun) consist of drier lowland rain forest. Ifon and Ila forest reserves are in Forest savanna mosaic.

Eight of the reserves with a total area of 1 920.48 km<sup>2</sup> were enumerated (Table 2) . A total of 94.5 km of transects were traversed and 81 nests counted. A mean density of 0.18 ± 0.04 chimpanzee/

\* Ihobe H. 1996. Lifespan of chimpanzee beds at Mahale Mt. National Park. Paper presented at the 16th Conf. of the Int. Primatological Society. Austria 1996.

km was calculated for the region based on the patches of forests enumerated. The density of chimpanzees was observed to be greater than 0.20/km<sup>2</sup> in only two forest reserves: Eba Island Forest Reserve (0.25/km<sup>2</sup>) and Ise Forest Reserve (0.25/km<sup>2</sup>).

The number of nests counted was greater than 20 only in the Ise Forest Reserve and above 10 in

three other reserves: Akure/Ofosu 13, Oluwa and Ago-Owu Forest 11 each. Chimpanzees were sighted only in Ise Forest Reserve. Two encounters were made in this particular study: a group of six animals and one old animal were encountered. Other forms of activities such as vocalizations, feeding signs, and feces were observed in the Oluwa, Shasha, Akure/Ofo-

**Table 1 Forest reserves identified to contain chimpanzee populations in south western Nigeria**

Serial No.	Forest Reserve	Location	Area of reserve (km <sup>2</sup> )	Vegetation type
1	Akure/Ofosu	Ondo State	401.0	Lowland rain forest: moist type*
2	Ala	Ondo State	199.43	Lowland rain forest: moist type
3	Eba	Ondo State	18.0	Freshwater swamp forest <sup>§</sup>
4	Idanre	Ondo State	540.33	Lowland rain forest: moist type
5	Ifon	Ondo State	132.09	Forest savanna mosaic <sup>§*</sup>
6	Okeluse	Ondo State	106.19	Lowland rain forest: moist type
7	Oluwa	Ondo State	318.66	Lowland rain forest: moist type
8	Onisere	Ondo State	98.42	Lowland rain forest: moist type
9	Owo	Ondo State	18.32	Lowland rain forest: drier type
10	Agi-Owu	Osun State	248.47	Lowland rain forest: drier type
11	Eti-Oni	Osun State	39.53	Lowland rain forest: drier type
12	Ila	Osun State	25.6	Forest savanna mosaic
13	Shasha	Osun State	230.64	Lowland rain forest: moist type
14	Ise	Ekiti State	56.89	Lowland rain forest: moist type
15	Ogotun	Ekiti State	10.0	Lowland rain forest: drier type <sup>**§</sup>

\* Lowland rain forest: moist type. Vegetation has close stand of trees and more than three layers are observed: shrubs and herbs layers present, lianas and epiphytes abundant. <sup>§</sup> Freshwater swamp forest. Vegetation has close stands of trees, not more than three layers are observed and some portions of forest floor are flooded seasonally or permanently. <sup>§\*</sup> Forest savanna mosaic. Close stands of trees are observed only in discrete locations within vegetation formation especially along rivers, streams and flood plains, grasses and epiphytes are present. <sup>\*\*§</sup> Lowland rain forest: drier type. Vegetation has close stands of three layers of trees consisting of lower and middle storey and a discontinuous layer taller emergent.

**Table 2 Summary of the nest distribution and status of chimpanzees in eight forest reserves in Southwest Nigeria**

S/N.	Forest reserve	Original area of reserve (km <sup>2</sup> )	Areas remaining under reservation	Number of transects traversed	Total length of transect covered (km)	Number of nests sighted	Estimated density/km <sup>2</sup>	Other types of chimpanzee activities observed
1	Okeluse	106.19	106.19	3	7.2	4	0.11	Vocalization
2	Akure/Ofosu	421.45	401	5	12.0	13	0.22	Vocalization, feeding signs, and feces
3	Idanre	540.33	540.33	5	12.0	9	0.15	Vocalization, feeding signs, and feces
4	Oluwa	678.06	318.66	4	15.0	11	0.15	Vocalization, feeding signs, and feces
5	Ise Ekiti	56.89	56.89	6	18.0	22	0.25	Vocalization, sighting, feeding signs, and feces
6	Shasha	308.34	230.64	3	14.2	7	0.10	Vocalization, and feeding signs
7	Ago-Owu	248.47	248.47	3	13.1	11	0.17	Vocalization, and feeding signs
8	Eba	18.3	18.3	2	3.0	4	0.25	—
Sum		2 378.03	1 920.48	94.5		81	Mean 0.18 ± 0.04	

su, Idanre and Ago-Owu reserves. Vocalizations were the only signs of chimpanzee presence recorded in the Okeluse Reserve while no other form of activity besides nest building was recorded at Eba. Some of the reserves share boundaries with one another and thus occupy two major distribution zones; (i) Idanre/Akure-Ofosu Forest Reserves and (ii) Shasha and Ago-Owu Forest Reserves. The Ise and Eba Forest Reserves are isolated smaller forests bounded on all sides by cultivated lands.

### 3 Discussion

This study indicates that a remnant manageable population of chimpanzees still exists in the forest zones of southwestern Nigeria. Chimpanzee density in the region is comparable to that reported for other locations. Tutin and Fernandez (1984) reported densities ranging from 0.03–0.49 in Gabon. Bloom et al. (2001) also reported a density of 0.16 for Dzang-Ndoki National Park Centre African Republic. Densities range from 0.11–0.25 in our study area. However, chimpanzee densities seem higher in the isolated smaller patches of forest than in the larger reserves with contiguous boundaries. This may result from the confined nature of the smaller reserves. In forest reserves with contiguous boundaries, chimpanzees are able to move more freely from one area to the other and to disperse more widely.

A total of fifteen forest reserves with a total area of 2 443.58 km<sup>2</sup> were found to harbor chimpanzees in this region. Chimpanzee presence was confirmed in eight of the reserves totaling 1 920.48 km<sup>2</sup> (78.59% of the area studied) by use of broad surveys. Although chimpanzee densities appeared low, the region could still be said to harbor a manageable population of significant research potential. It is difficult to derive useful estimates of the numbers of chimpanzees in this region because the forests have a patchy distribution. However, the estimated densities for the forests and the number of nests sighted in each of the sampled reserves give some clues as to the status of chimpanzees. Most of these forest refuges are in areas that are not easily accessible to logging vehicles in reserves with rugged terrain such as Akure/Ofosu, Idanre, Okeluse and Shasha. In others with fairly even surfaces like Ise and Ago-Owu, the animals' presence was observed in exploited forest, of over five years supporting the view of Persson and Warner (2003) that chimpanzees prefer less disturbed forest.

Some of the challenges facing the conservation of chimpanzees in S.W. Nigeria are: (i) loss of forest cover, largely on account of over exploitation of timber, which occurs virtually everywhere in the forest reserves of this region, (ii) deforestation on the order of government, for farming and (iii) uncontrolled

hunting. For instance, chimpanzees were once present in the Ala forest reserve (Agbelusi, 1994). However, their current status is uncertain because the reserve has been reduced by more than 50% and completely logged out of its timber species. Sunderland et al. (2003) remarked that conservation in an area where people rely on exploitation of forest resources for their livelihoods is a sensitive and complex challenge. This challenge must be surmounted if the chimpanzees of this region are to survive.

Two alternatives appear to be open for *in-situ* conservation of chimpanzees in S. W Nigeria. A suitable portion of one of the large forest reserves could be zoned for protection or, alternatively, one of the isolated smaller forest reserves could provide a sanctuary. However, considering the experience of Omo Biosphere reserve, demarcating new areas from the larger commercially exploited reserves may not produce the desired result. Persson and Warner (2003) reported that Omo Forest reserve contained a large number of plantations created from cleared forest. Such activities are known to increase population and consequently human activities within the forest environment. The same situation applies to the Oluwa, Akure/Ofosu and Idanre Forest reserves. Ojo (2004) reported that even the inviolate area of Omo reserve is being abused. Policing of the larger reserves has traditionally proven to be very difficult. Many illegal settlements have sprung up within the reserves, as a consequence of the exodus of migrant farmers. This situation has recently become a political issue and the possibility of removing such farmers is remote. Conversely, it is very likely that farming activities will increase.

Setting aside one of the smaller isolated forest reserve may be more desirable for the conservation of chimpanzees. This option would provide a sanctuary with a clearly defined boundary. Monitoring activities would be easier under these circumstances. Ise Forest Reserve seems suitable for this purpose; it is in the northern part of the belt where conflict with Oil and Bitumen exploration and operation does not exist. Population growth in the area also is not too large. Chimpanzees in the reserve have been studied for a considerable time (Gonder et al., 1997; Agbelusi et al., 1999; Ogunjemite, 2004; Ogunjemite et al., 2005).

The status of the chimpanzee is described as rare and endangered, based on IUCN criteria. However, some remnant manageable populations of this endangered primate species are still scattered throughout the forests of Southwest Nigeria. Efforts should be made to step up protection measures in order to conserve what remains of these populations. There is also the need to continue the monitoring operations, with

special emphasis on chimpanzee distribution, abundance and habitat use in the region.

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