A Survey of Sclater’s Guenon in Ikot Uso Akpan Community Forest, Itu, Nigeria

Jacob D. E. 1, I. U. Nelson 2
1 Forestry and Wildlife Department, University of Uyo, Nigeria
2 Biodiversity Preservation Center, Uyo, Nigeria

Abstract The study assessed the population of Sclater's guenon (Cercopithecus sclateri Pocock 1904) in Ikot Uso Akpan community forest. Line transect method with its census protocol was adopted for the survey. Data obtained were analyzed using descriptive statistics, means, and frequency. The result shows that all the parameters measured across the two season showed no significant difference (p < 0.05) except for the differences in the sighting distances between the dry and rainy season which was observed to be significantly different (p < 0.05). The species had a mean encounter rate of 1.18km⁻¹, cluster/group density of 16.86±0.99km⁻¹, individual density of 82±2.64km⁻¹, population density of 57.40±1.85km⁻¹, Biomass density of 266.5±8.58kg/km², and a population mass of 190.35±9.81kg. Habitat degradation as a result of logging in the area is on the increase and has attendant negative impact on the population structure of Sclater’s guenon in the study area resulting in an ageing population. Adequate measures are urgently needed to restore and conserved the forest fragment to ensure the survival of the endemic primate species in the study area.

Keywords Sclater's guenon, Community forest, Deforestation, Conservation, Nigeria

Introduction A large proportion of the world’s biodiversity is contained in the tropical ecosystem (Soehdi et al., 2004; Quinten, 2008). However, the region is under severe pressure from rapid and widespread habitat destruction, thus posing a threat to the local biota (Lawrence, 1997). The above issue is particularly serious because the tropics is the world's highest ranking region in terms of species richness and endemism (Mittermeier et al., 1997; Myers et al., 2000) and more than forty two percent (42%) of its biodiversity could be lost (Soehdi et al., 2004). Biodiversity, however, is the very foundation of human existence as it constitutes the resource upon which virtually everyone depends, its conservation therefore becomes very pertinent (Groves, 2000).

In Africa, particularly Nigeria, deforestation is a major problem and the forest is destroyed at a relative rate that is higher than those of other tropical regions (Udofia et al., 2011). Some of these include land clearing for agriculture, uncontrolled logging, gathering of firewood (Asibey and Child, 1990); overgrazing, indiscriminate or ill-planned bush burning; high population rate and illegal hunting for bush meat (Aghelusi, 1994; Ayodele and Lameed, 1999).

Within Africa, Nigeria is the most biologically diverse country and ranked second in terms of primate endemism in the world (Mittermeier and Cheney, 1987; Grubb et al., 2000; Egwali et al., 2005). In spite of this status in primate diversity, the country is exposed to forces of species loss and decimation as a result of anthropogenic perturbation resulting from urbanization, agriculture, deforestation, industrialization as well as other sundry activities (Eniang, 2001; Eniang and Ebin, 2002; Egwali et al, 2005). Consequently, most primate species in the country are currently threatened at various levels which are inimical to their continuous...
survival. Arising from the foregoing, most of the primate species in the country are either threatened or either classified as vulnerable, endangered or critically endangered in the IUCN Red List of Threatened Species (IUCN, 2011). The Sclater's guenon (*Cercopithecus sclateri* Pocock, 1904; local is one of the critically endangered primates of African continent (Egwali et al., 2005). It has been rated among the most threatened of African species and considered as one of the highest priority species for conservation action amongst the African primate taxa (Oates, 1994, Tooze, 1994a, b, 1995; cites.org). It is also the most threatened of the African guenons (Oates and Anadu, 1989).

**Materials and Methods**

**Study area**

Ikot Uso Akpan is located in the southern part of Nigeria in Akwa Ibom State between 5°7'49"N and 7°56'47"E and lies between Ikot Uso Akpan and Obong Itam villages in Itu Local Government Area (Egwali et al., 2005). Itu Local Government Area occupies a landmass of approximately 606.10 square kilometers (onlinenigeria.com, 2011). It is bounded in the North and North-East by Odukpani in Cross River State and Arochukwu in Abia State, in the West by Ibiono Ibom and Ikono Local Government Areas, in the South and South-East by Uyo and Uruan Local Government Areas, respectively. The vegetation of the area along the West line is a swamp forest and moist lowland forest in the interline (onlinenigeria.com, 2011). The topography of the area is highly undulating. The area has eight to nine months of raining season and a short period of three to four months of dry season. The area has a mean annual rainfall ranges of 2500mm to 3000mm with a mean annual temperature of about 26.1°C and a relative humidity of 85 percent (Metz, 1992; Fasona and Omojola, 2005).

**Sampling design**

The survey of *C. sclateri* in the study area was carried out using the Line-transect method. The line-transect is a plotless method in which the observers walk along straight lines of known length, and are either placed randomly or systematically across the survey area. This method has been successfully applied in previous studies in the tropics (Janson and Goldsmith, 1995; Buckland et al., 2001; Aguiar and Lacher, 2003; Egwali, et al., 2005; Quinten, 2008). To ensure accurate density estimates of *C. sclateris*, the five fundamental assumptions of Line-Transect method which are; 1) Objects directly on the line will never be missed, i.e., g(0) = 1, 2) Points are fixed at the initial sighting position (i.e., no movement before or after), 3) Distance and angles are measured exactly, 4) Sightings are independent events, and 5) For clustered populations, the probability of sighting a cluster is independent of cluster size were observed (Buckland et al., 1993, 2001; Quinten, 2008) for every survey.

The transect lines spanned up to 2km and traversing the community forest to ensure every portion of the forest was systematically covered in the study. The transect line had a diameter of 1m and sighting was extended to 10m on both sides of the transect line. *C. sclateri* survey was carried out once every week for a period of 6 months (3 months each for both dry and rainy seasons) between 7.00 to 9.00; 9.30 to 11.30; and 15.30 to 17.30 every census day with the help of two experienced locals who were familiar with the study area and monkey. Both locals were made familiar with the survey equipment (GPS, range finder and sighting compass, binoculars, etc) and the census protocol. Survey was carried out once a week for a period of six months and both visual and audio observations encountered were documented. Survey was avoided during rainy days, mainly for two reasons; first, the raindrops falling in the forest will create an unfavorable acoustic background for survey reducing the ability to hear typical animal movements, thus potentially precluding the detection of *C. sclateri* which would have otherwise been recorded (Peres, 1999). Secondly, some primate species have been observed to move little or even remain motionless in a tree during rain (Whitten, 1982; Feuntes, 1996), a behavior which reduces their likelihood of being detected.

**Results**

**Distance of encounter**
Table 1: Seasonal survey differences of Sclater’s guenon in Ikot Uso Akpan community forest

<table>
<thead>
<tr>
<th>Variables</th>
<th>Adult</th>
<th>Juvenile</th>
<th>Individual count</th>
<th>Group count</th>
<th>Distance (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry</td>
<td>62</td>
<td>19</td>
<td>81</td>
<td>16</td>
<td>415</td>
</tr>
<tr>
<td>Rainy</td>
<td>65</td>
<td>21</td>
<td>86</td>
<td>18</td>
<td>275</td>
</tr>
<tr>
<td>Total</td>
<td>127</td>
<td>40</td>
<td>167</td>
<td>34</td>
<td>690</td>
</tr>
<tr>
<td>Mean/Season</td>
<td>63.5</td>
<td>20</td>
<td>83.5</td>
<td>17</td>
<td>345</td>
</tr>
<tr>
<td>Mean/Transect</td>
<td>4.23</td>
<td>1.33</td>
<td>5.56</td>
<td>1.13</td>
<td>23</td>
</tr>
<tr>
<td>T- Cal</td>
<td>0.54</td>
<td>0.83</td>
<td>0.61</td>
<td>0</td>
<td>41</td>
</tr>
<tr>
<td>T – Tab (P = 0.05)</td>
<td>2.01ns</td>
<td>2.04ns</td>
<td>1.98ns</td>
<td>2.04ns</td>
<td>1.96**</td>
</tr>
</tbody>
</table>

Table 2: Estimates of density, abundance and biomass of Sclater’s guenon in Ikot Uso Akpan

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey method</td>
<td>Line transect</td>
<td>Point survey</td>
<td>Point survey</td>
<td>Point survey</td>
<td>Point survey</td>
</tr>
<tr>
<td>Mean encounter rate (n/L)</td>
<td>1.18</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cluster/group density (km⁻¹)</td>
<td>16.86±0.99</td>
<td>14.29±2.86</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Individual density (km⁻¹)</td>
<td>82±2.64</td>
<td>85±3.57</td>
<td>82.06</td>
<td>70.32</td>
<td>80</td>
</tr>
<tr>
<td>Population density (D)</td>
<td>57.40±1.85</td>
<td>59.5±2.5</td>
<td>58</td>
<td>50</td>
<td>56</td>
</tr>
<tr>
<td>Mean weight (kg)</td>
<td>3.25</td>
<td>3.25</td>
<td>3.25</td>
<td>3.25</td>
<td>3.25</td>
</tr>
<tr>
<td>Biomass density (kg/km²)</td>
<td>266.5±8.58</td>
<td>276.25±11.6</td>
<td>266.70</td>
<td>228.54</td>
<td>260</td>
</tr>
<tr>
<td>Population biomass (kg)</td>
<td>190.35±9.81</td>
<td>193.38±8.13</td>
<td>188.50</td>
<td>162.50</td>
<td>182</td>
</tr>
</tbody>
</table>

The result of estimate for distance between observer and animal when first sighted during the dry and rainy season (Figure 1) indicates that in the dry season, no encounter was made within 5m sighting distance of the line transect. A greater proportion of the encounter made in the dry season was within 21m and 35m sighting distance of the transect line. The result of the rainy season encounter showed that there was an encounter with *Cercopithecus sclateri* within the 5m transect line which was not observed in the dry season census. Majority of the rainy season encounter was observed between the 11m and 25m width of the transect line.

Seasonal variation in census data

The result shown in Table 1 indicates the difference between the various parameters measured during the census of Sclater’s guenon in the study area. The result shows there was difference between all the parameters measured during the dry and rainy season. A total of 62 adult Sclater’s guenon was observed in the dry season which was less than the observation of 65 adults in the rainy season with a mean of 63.5 adult/season and 4.23 adult/transect. The juvenile population encountered in the study area was 19 and 21 in the dry and rainy seasons respectively. The juvenile encounter had a mean of 20/season and 1.33 encounter/transect surveyed. Furthermore, the individual count of *Cercopithecus sclateri* for the dry season was less than the rainy season encounter of 86 individual. The mean of individual count/season was 83.5 with a mean individual encounter/transect of 5.56 individuals. The group count of *Cercopithecus sclateri* was 16 for the dry season and 18 for the rainy season. Both season had a mean count of 17 group and a mean of 1.13 group/transect surveyed in the study area. It took a
total of 415m perpendicular distance in the dry season to make a total of 81 individual count and 16 group count in the study area and a total of 275m perpendicular distance in the rainy season to make a total of 86 individual count and 18 group count in the study area. The mean seasonal perpendicular was 345m to a total of 83.5 individual count and 17 individual count while the mean perpendicular distance per transect surveyed was 23m to make a total of 5.56 individual and 1.13 group survey in Ikot Uso Akpan community forest.

However, an analysis of the differences between all the parameters measured across the two season (Table 1) showed no significant difference ($p > 0.05$) except for the differences in the sighting distances between the dry and rainy season which was observed to be significantly different ($p < 0.05$)

**Density, Abundance and Biomass of Sclater’s Guenon**

Table 2 lists all parameters upon which the analysis was based and the respective values obtained in each study year. The survey designs for all the previous years were slightly different from the present study. The formers all used point survey method while line transect method was employed for this study. As a consequence of this survey method, the population data obtained in 2012 showed an increase in cluster/group density when compared with the data obtained by Egwali et al. (2005). However, the individual population (82 individual/km$^2$), Total population density (57.40 individual/km$^2$), Biomass density (266.5 kg/km$^2$)and Total population biomass (190.35kg/km2) of Sclater’s guenon obtained for the present study was less than that of Egwali et al. (2005) and Okon (2004). These values obtain for the present study was higher than those obtained by Udoedu (2004) and Ibong (2002).

**Discussion**

Primate socio-ecological models indicate that the time spent on resting by Sclater’s guenon and other tropical primates is a function of seasonality, the percentage of leaves in the diet, and the annual mean temperature (Korstjens et al., 2006; 2010). In concurrence with this hypothesis, it was observed that the time spent by Sclater’s guenon resting was higher during the dry season, when consumption of leaves was low, and ambient temperature was high, hence there was low detection than in the rainy season.

Also, independent of habitat type, time spent feeding by some primate species are usually higher during the rainy than the dry season. Studies suggests that seasonal increases in ambient temperature, such as that occurring during the dry season, may stimulate primates to reduce heat-generating activities such as feeding to avoid thermal overload and its associated energetic costs (Dunbar, 1992; Korstjens et al., 2010). This explanation is consistent with studies on spider monkeys (Chapman and Peres, 2001; Korstjens et al., 2006). Greater feeding in the rainy season is interpreted as strategy for some tropical monkeys to take advantage of peak seasonal foods, allowing them to ingest surplus energy and store it as fat in
preparation for the impending period of food scarcity. This study’s observation partially supports this possibility because it was observed that as a result of Sclater’s guenon spending more time feeding, detection was slightly higher in the rainy season than in the dry season which therefore corresponded in higher population data in the rainy season and a subsequent less detection distance.

The quality of habitat in Ikot Uso Akpan is believed to have a great influence on the birth, death, immigration, and emigration rates of the species population living there. It supports the hypothesis that the female reproductive success is dependent on habitat quality and group size, implying that increased competition in larger groups is usually offset the amounts of food available in the habitat. However, some other studies of primarily folivorous primates have shown that group size has no effect on their reproductive success (Stokes et al., 2003; Robbins et al., 2007; Steenbeek and van Schaik, 2001) although such results are not universal (Burries et al., 2008; Snaithe and Chapman, 2008; Marshall, 2010). Illegal logging activities (Figure 2 and 3), rubber plantation establishment (Figure 4), and clearance for farming activities in the study area could also be said to have impacted negatively on the population of Sclater’s guenon. Consequently, there was a decrease (3.53%) in the species population between 2005 and 2012 as there has been increased rate of deforestation over the period under survey.

Conclusion
Indiscriminate logging, unsustainable extraction of non-timber forest products, oil palm and rubber plantations establishment and agricultural conversion of the forest ecosystem in Ikot Uso Akpan community forest is on the increase. Although there are still pockets of forest fragments in the area, a continuous logging in the area if unabated will claim even more of the habitat which is so essential for the primate species and all other local wildlife species. Presently, the area has lost a sizable population of the Sclater’s guenon population in the past 10 years due to habitat alteration and destruction. This therefore calls for appropriate action to save the species from extinction through efforts that will prevent a further decline of primate population.

References
http://dx.doi.org/10.1007/BF00167814
http://dx.doi.org/10.1007/BF02735190
http://dx.doi.org/10.1017/CBO9780511542389.005
http://dx.doi.org/10.1093/beheco/6.3.326

http://dx.doi.org/10.1016/j.anbehav.2009.11.012

http://dx.doi.org/10.1007/s00265-006-0212-2

Lawrence W.F., 1997, Reflections on the Tropical Deforestation Crisis, Biological Conservation, 91: 107-119

http://dx.doi.org/10.1007/978-1-4419-1560-3_9


http://dx.doi.org/10.1038/3502501

http://dx.doi.org/10.1159/000156386

http://dx.doi.org/10.1002/ajp.1350340111

Okon A.T., 2004, Ecology and Conservation of the Sclater's guenon (Cercopithecus sclateri); Territorial and Ranging Pattern in Itu Local Government Area of Akwa Ibom State, Undergraduate Project submitted to the University of Uyo, Uyo, pp.64


Quinten M., 2008, Survey of Primate Community of Peat Swamp Forests of Siberut, Mentawai island, Indonesia, M.Sc./M.I.N.C., Thesis submitted to the Faculty of Biology, Georg-August Universitat Gottingen, Germany and Lincoln University, New Zealand

http://dx.doi.org/10.1007/s00265-006-0321-y

http://dx.doi.org/10.1016/j.tree.2004.09.006

http://dx.doi.org/10.1007/s002650000286

Stokes E., Parnell R., and Olejnirczk C., 2003, Female Dispersal and Reproductive Success in Wild Western Lowland Gorillas (Gorilla gorilla gorilla), Behav. Ecol. Sociobiol., 54: 329–339
http://dx.doi.org/10.1007/s00265-003-0630-3


Udoedu U.E., 2004, Socio-biology of Sclater's guenon (Cercopithecus sclateri) in Itu Local Government Area, Undergraduate Project submitted to the University of Uyo, Uyo, pp.52


http://dx.doi.org/10.2307/2259877