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in Federal University of Agriculture, Abeokuta
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ABUNDANCE OF FREE RANGE NATURAL INHABITANTS IN FEDERAL UNIVERSITY OF AGRICULTURE, ABEOKUTA ZOO PARK, NIGERIA

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ABSTRACT: The study examined the abundance of free range natural inhabitants of FUNAAB ZOO PARK. A baseline data of free ranging inhabitants of the Park is essential to monitor trends and institute conservation plans through unsustainable natural resources exploitation and habitat destruction. Four transects were selected across the study area and each transect was traversed for the period of four months (August 2017 – December 2017) for the field work. Observations were carried out twice a day. A total of 272 animals were encountered in the four transects. These included 115 animals in the primate transect which forms 43.3% of the total population, also in carnivores transect a total of 77 animals, 46 animals in aviary transect and 34 animals were encountered in ungulates transect which were 28.3%, 15.8% and 12.5% respectively. Data were analyzed using descriptive statistic. Heterogeneity of the site in terms of wildlife species was explored using Simpson diversity indices. The abundance of animals encountered in the Primate transect indicated free-ranging activities within the zone and this is due to the fact that this portion of the Zoo park experiences less human activities unless in the case of staff on special surveillance. Lower animal population was encountered in the ungulate transect and probably due to closeness to the activity Centre of the Zoo Park where the vegetation is open and human activities of both staff and visitors is more pronounced. Human activities and level of disturbance was observed to have affected the abundance and distribution of animals at Funaab Zoo Park. Continuous field inventory is recommended to ascertain the dynamics of animals observed as free- range inhabitants in this study.

Keywords: Abundance, Ecosystem, Extinction, Free Range

1. INTRODUCTION

Conservation of wildlife species is an essential part of wildlife management, and where species have been exploited; protection of these animals in National Parks or other rigidly controlled areas may be the only practical solution to ensure survival. The global human population is increasing and was recently estimated to be 7 billion (UNFPA, 2011), which in turn is placing tremendous strain on the planet's natural resources. As the world's

human population increases, there is an increased demand for space and resources resulting in increased transformation of natural habitat. Such landscape modification and the resultant human-dominated environments are the primary drivers of species extinction on a global scale (Dale and Polasky 2007; Didham *et al.*, 2007; Bellard *et al.*, 2012). Five mass extinction events have been documented throughout the history of the Earth, resulting in the extinction of over 90% of all species. The causes of these events are

believed to be largely due to a change in global climate or extra-terrestrial impact (Erwin 2001). Consequently, many species have been reported in decline (Craigie *et al.*, 2010, Woinarski *et al.*, 2011). In addition, the current mass extinction is very different from all others so far as human activity is directly implicated in the continuous adverse impacts on biodiversity (Wood and Pullin 2002).

The main drivers of biodiversity loss today include overexploitation by humans (Mora *et al.*, 2007, Butchart *et al.*, 2010, Nuwer and Bell 2014), resource consumption (the rise in non-renewable resource use by the growing human population) (Liu *et al.*, 2003, Golden *et al.*, 2011), habitat destruction/disturbance (Brooks *et al.*, 2002, Titeux *et al.*, 2016), pollution and the impact of climate change (Bickham *et al.*, 2000) all of which are due to anthropogenic factors. Consequently, conservation effort is targeted towards protecting diversity of threatened species within the world's protected area network, particularly in tropical regions and other species-rich Eco regions, where large numbers of species face extinction (Butchart, *et al.*, 2010). However, conservation often tends to focus on conserving remnant or fragmented habitat patches without separating the biodiversity from the processes that threaten its existence. Hence, Protected Areas often fail in achieving the conservation goals as the threats are still present (Margules and Pressey 2000, Hoekstra *et al.*, 2005).

Generally, biodiversity loss is threatened by multiple and interrelated factors that includes pressures that are mostly human-induced disturbance to ecosystems, socio-economic effects, failure in governance, poor decision making and policy (Failing and Gregory 2003, Slingenberg, *et al.*, 2009, Craigie *et al.*, 2010). The cause of biodiversity loss differs and depends on the biome, geography, climate, and type of pressure, biodiversity host country economy, trade patterns, type of governance structure, and other factors.

2. MATERIALS AND METHODS

2.1. Study Area

The study was carried out at Federal University of Agriculture Abeokuta Zoo Park, Ogun state, Nigeria (FUNAAB Zoo Park), and situated North East of Abeokuta along Alabata road. The site is located between the latitude 7° and 7°58'N and longitude 3°30' and

3°37'E. FUNAAB Zoo Park was commissioned for use on the 23rd May 2012. It is the first of its kind in the annals of zoological gardens in academic institutions in Nigeria. Sites designated as “Zoo Parks” greatly vary with respects to the size of land area covered which gives the park inmates the sense of being in their natural environments. The FUNAAB Zoo Park covers an area of about 62 hectares of land and situated within the rolling ridges, to the left at the entrance of FUNAAB Alabata campus.

2.2. Method of Data Collection

Reconnaissance survey was carried out in the study area to identify the likely routes and habitats where the natural inhabitants could be found. Four (4) existing tracks in the Park were selected for the survey. The existing tracks in the Zoo premises were used as transects to identify and record animals observed shrubs, grasses or forages around them. The Four existing tracks explored during the study were the aviary, reptile, carnivore and primate tracks.

The aviary transect covers from the African Grey Parrot cage to the Crocodile pool by the boundary of the zoo is about 1 kilometer distance. The reptile transect covers about 1kilometres from the crocodile pool to porcupine cage.

The ungulate transect covers from the Teak/Gmelina plantation on the “professional mistake” to the fence toward the International Conference Centre a stretch of about 800Metres.

The Primate transect starts from the Baboon cage to temporary site of the Zoo covering a distance of about 1.5 kilometres.

Each transects were combed twice a day for the period of five (5) months. Morning (6:30 am – 8:30 am) and evening (5-7pm). Pictures and numerical records of animal sighted with their activities were recorded through direct counts of animals encountered.

2.3. Data Analysis

Data were analyzed using descriptive statistic. Heterogeneity of the site in terms of wildlife species was explored using Simpson diversity indices (Simpson, 1949) and Similarity in PAST Model version 3.0.

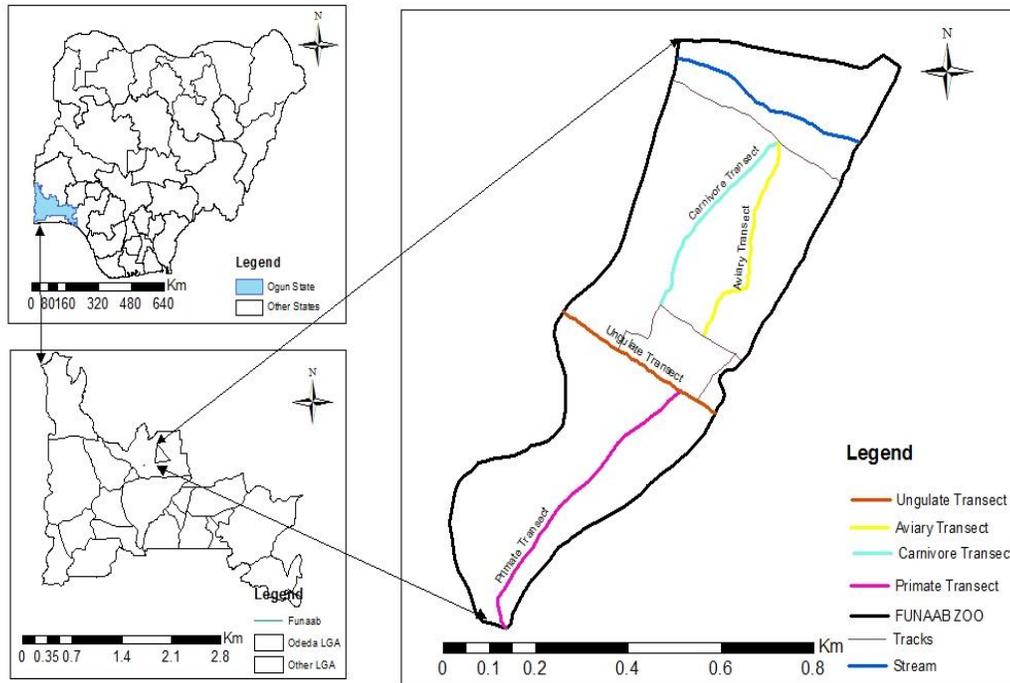


Figure 1: Map of the study Area. Source Funaab Zoo Park.

3. RESULT

3.1. Abundance of Wildlife Species in Funaab Zoo Park

Table 1 shows the list of wild animals encountered in FUNAAB Zoo park during the period of the survey across the transects. Primate Track, Carnivores track, Aves track and Ungulate track. A total of 272 animals were encountered. The highest population were encountered along the Primate track (115), followed by carnivores (77), Aves (46) while the least were encountered in along the ungulates track (34). However, there is a significant difference ($p < 0.05$) = 0.001 in the diversity of animal species between the transects.

3.2. Distribution of Animals Population across the Transects

Table 2, shows the distribution of wild animals from August to December, 2017. In August, the highest population of the animals were encountered along the carnivore track. In September, Primate Track had the highest population of animals' species, while in October, Carnivores track was the most populated with animals. In November, Primate Track was the most populated with animal's species and in December, Primate Track had the highest population of animals.

This implies that animals move from Carnivores to Primate transects, this shows that animals are visible in this section compare to other transect section. The reason is that the two transects are both within the heart of the FUNAAB Zoo Park with less disturbance from human activities.

Table 1: Population of some natural inhabitants encountered across the transects during the field survey

Name of Animals	Primate	Carnivore	Aviary	Ungulate	Total	Mean± SD
Vervet Monkey	84	49	35	29	197	49.25±24.68
Maxwell Duiker	4	0	2	4	10	2.5±1.19
Mongoose	18	18	6	0	42	10.5±9.00
Bushbuck	4	6	2	0	12	3.0±2.58
Cobra	0	2	1	0	3	0.8±0.95
Ground squirrel	1	1	0	0	2	0.5±0.58
Senegal coucal	2	1	0	1	4	1.0±0.82
Black kite	2	0	0	0	2	0.5±1.00
Total	115	77	46	34	272	

Source: Field survey, 2017.

Table 2: Population of natural inhabitants encountered during the field study

Animals	Months					Total	Mean±SD
	August	September	October	November	December		
Vervet Monkey	28	39	53	77	0	197	39.4±28.64
Maxwell Duiker	2	1	2	1	4	10	2±1.22
Mongoose	6	9	5	5	17	42	8.4±5.08
Bushbuck	0	0	4	2	6	12	2.4±2.61
Cobra	0	1	1	0	1	3	0.6±0.55
Senegal Coucal	2	1	0	0	1	4	0.8±0.84
Ground squirrel	0	0	2	0	0	2	0.4±0.89
Black Kite	0	1	1	0	0	2	0.4±0.55
TOTAL	38	52	68	85	29	272	

Source: Field survey, 2017.

3.3. Diversity Indices

Result of Simpson diversity index presented in table 3; clearly shows that the transect 1 has the highest (0.6097) while transect 2 (0.533) follows, others are transect 3 (0.3998) and 4(0.2578) in descending orders.

3.4. Similarity Indices

Similarity indices of animal species were calculated to show clearly, the degree of association or resemblance in species composition, richness and distribution between paired transects. It can be used to deduce the percentage variation or richness and composition if the model below is adopted; Similarity or variation in animal species composition between paired transect explored with Simpson Similarity index reveals that species composition of animals between paired transects in study site vary too much (table 4).

Table 3: Simpson Diversity Indices of Animal Species in the Study Area

Transects	$N(N-1)/ \sum ni(ni - 1)$
1.	0.6097
2.	0.5333
3.	0.3998
4.	0.2578

Table 4: Simpson Similarities Index of Animal Species Between Paired Transects in the Study Area

Transect	1	2	3	4
1	1	0.83	0.80	1
2	0.83	1	0.80	0.67
3	0.80	0.80	1	0.67
4	1	0.67	0.67	1

4. DISCUSSION

The study shows that a total of 272 animals were encountered in the four transects. These include 115 animals in the primate transect which forms 43.3% of the total population. 77 animals in carnivores transect, 46 animals in aviary transect and 34 animals were encountered in ungulates transect which are 28.3%, 15.8% and 12.5% of total animals encountered respectively. The more animals encountered in the Primate transect indicates that there was much animal activities there and this is due to the fact that this portion of the Zoo park experience less human activities unless in the case of staff on special surveillance in this area. Lower animal population was encountered in the ungulate transect and this is due to the fact that the transect is close to the activity centre of the Zoo Park where the vegetation is open and human activities of both staff and visitors are more pronounced. Similar observation was made by Margules and Pressy (2000) who identified social activities as one the factors that contributed to abundance and distribution of animals. The result further revealed that, a total of 8 species of natural inhabitants were identified. This result can be compared with similar studies by Afolayan and Salami (1983) in the Abundance and Distribution of Large Mammals in the Upper Ogun Game Reserve, Oyo State, Nigeria where similar line transect techniques was used and the number of species recorded is considered. This is also in accordance with the findings of Kasso *et al.*, 2010 and Girma *et al.*, 2012.

5. CONCLUSIONS AND RECOMMENDATIONS

The following conclusion are drawn from this study:

1. The study site is rich floristically, hence it supports the survival of some species of animals as it serves as good refuge and food for wildlife.
2. In terms of population of different species, the Vervet Monkey maintain the lead as is the most abundant species in the study area.
3. No animal species is restricted to a specific transect but evenly distributed across all the transects, even though some like the Vervet are restricted to those transects that can offer the food and cover.
4. The study also confirms that an animal has the tendency to learn how to co-habitate with intense human activities and presence.
5. The result obtained indicates that animals had the highest population density in the primate and carnivorous transects in the study area where we had less disturbance from human activities.
6. It is recommended that trap cameras should be mounted in strategic locations within the Zoo Park

to monitor the activities of the free range species devoid of illegal incursion by man.

REFERENCES

- Afolayan, T., Milligan, K. and Salami, S., (1983). Abundance and Distribution of Large Mammals in the Upper Ogun Game Reserve, Oyo State, Nigeria. *International Journal for the Study of Animal Problems*, 4(1), 33-44.
- Bellard, C., Bertelsmeier, C., Leadley, P., Thuiller, W., & Courchamp, F. (2012). Impacts of climate change on the future of biodiversity. *Ecology letters*, 15(4), 365-377.
- Bickham, J. W., Sandhu, S., Hebert, P. D., Chikhi, L., & Athwal, R. (2000). Effects of chemical contaminants on genetic diversity in natural populations: implications for biomonitoring and ecotoxicology. *Mutation research/Reviews in Mutation research*, 463(1), 33-51.
- Brooks, T. M., Mittermeier, R. A., Mittermeier, C. G., Da Fonseca, G. A., Rylands, A. B., Konstant, W. R., ... & Hilton-Taylor, C. (2002). Habitat loss and extinction in the hotspots of biodiversity. *Conservation biology*, 16(4), 909-923.
- Butchart, S. H., Walpole, M., Collen, B., Van Strien, A., Scharlemann, J. P., Almond, R. E., and Watson, R. (2010). Global biodiversity: indicators of recent declines. *Science*, 328(5982), 1164-1168.
- Craigie, I.D., Baillie, J.E., Balmford, A., Carbone, C., Collen, B., Green, R.E. and Hutton, J.M., (2010). Large mammal population declines in Africa's protected areas. *Biological Conservation*, 143 (9), 2221-2228.
- Dale, V. H., & Polasky, S. (2007). Measures of the effects of agricultural practices on ecosystem services. *Ecological economics*, 64(2), 286-296.
- Didham, R. K., Tylianakis, J. M., Gemmill, N. J., Rand, T. A., & Ewers, R. M. (2007). Interactive effects of habitat modification and species invasion on native species decline. *Trends in ecology & evolution*, 22(9), 489-496.
- Erwin, D. H. (2001). Lessons from the past: biotic recoveries from mass extinctions. *Proceedings of the National Academy of Sciences*, 98(10), 5399-5403.
- Failing, L., & Gregory, R. (2003). Ten common mistakes in designing biodiversity indicators for forest policy. *Journal of environmental management*, 68(2), 121-132.
- Girma, Z., Mamo, Y., & Ersado, M. (2012). Species composition, distribution and relative abundance of large mammals in and around Wondo Genet Forest Patch, Southern Ethiopia. *Asian Journal of Applied Sciences*, 5(8), 538-551
- Golden, C. D., Fernald, L. C., Brashares, J. S., Rasolofoniaina, B. R., & Kremen, C. (2011). Benefits

- of wildlife consumption to child nutrition in a biodiversity hotspot. *Proceedings of the National Academy of Sciences*, 108(49), 19653-19656.
- Hoekstra, J. M., Boucher, T. M., Ricketts, T. H., & Roberts, C. (2005). Confronting a biome crisis: global disparities of habitat loss and protection. *Ecology letters*, 8(1), 23-29.
- Kasso, M., Bekele, A., & Hemson, G. (2010). Species composition, abundance and habitat association of rodents and insectivores from Chilalo–Galama Mountain range, Arsi, Ethiopia. *African journal of Ecology*, 48(4), 1105-1114
- Liu, J., Daily, G. C., Ehrlich, P. R., & Luck, G. W. (2003). Effects of household dynamics on resource consumption and biodiversity. *Nature*, 421(6922), 530-533.
- Margules, C. R., & Pressey, R. L. (2000). Systematic conservation planning. *Nature*, 405(6783), 243-253.
- Mora, C., Metzger, R., Rollo, A., & Myers, R. A. (2007). Experimental simulations about the effects of overexploitation and habitat fragmentation on populations facing environmental warming. *Proceedings of the Royal Society B: Biological Sciences*, 274(1613), 1023-1028.
- Nuwer, R., & Bell, D. (2014). Identifying and quantifying the threats to biodiversity in the U Minh peat swamp forests of the Mekong Delta, Vietnam. *Oryx*, 48(1), 88-94.
- Simpson, E. H. (1949). Measurement of diversity. *Nature*, 163(4148), 688-688.
- Slingenbergh, A., Braat, L., Van Der Windt, H., Rademaekers, K., Eichler, L., & Turner, K. (2009). Study on understanding the causes of biodiversity loss and the policy assessment framework. *European Commission Directorate-General for Environment, available at http://ec.europa.eu/environment/enveco/biodiversity/pdf/causes_biodiv_loss.pdf*.
- Titeux, N., Henle, K., Mihoub, J. B., Regos, A., Geijzendorffer, I. R., Cramer, W., ... & Brotons, L. (2016). Biodiversity scenarios neglect future land-use changes. *Global change biology*, 22(7), 2505-2515.
- UNFPA, 2011. State of the world population. <https://www.unfpa.org/sites/default/files/pub-pdf/EN-SWOP2011-FINAL.pdf> ed. United Nations Population Fund.
- Woinarski, J.C., Legge, S., Fitzsimons, J.A., Traill, B.J., Burbidge, A.A., Fisher, A., Firth, R.S., Gordon, I.J., Griffiths, A.D. and Johnson, C.N., 2011. The disappearing mammal fauna of northern Australia: context, cause, and response. *Conservation Letters*, 4 (3), 192-201.
- Wood, B. C., and Pullin, A. S. (2002). Persistence of species in a fragmented urban landscape: the importance of dispersal ability and habitat availability for grassland butterflies. *Biodiversity & Conservation*, 11(8), 1451-1468.