

THE FAUNA BIODIVERSITY OF IKOT ONDO COMMUNITY FOREST IN ESSIEN UDIM L. G. A. OF AKWA IBOM STATE, SOUTH EASTERN NIGERIA

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Abstract

Prolonged deforestation, poaching and wildlife habitat loss has been a serious threat to wildlife conservation in Nigeria, thereby endangering fauna diversity resources in the country. This study was carried out to determine the population estimate of wild fauna in the communal land of Ikot Ondo Community forest in Essien Udim L. G. A. of Akwa Ibom State. The forest is situated in a rainforest ecosystem surrounded by villages whose source of livelihood is mainly through exploitation of the forest resources. The study showed the avifauna species to be more abundant with species indices of -1.2985 and 11.6246 respectively when compared with those of mammals (-1.1914 and 12.5174), amphibian and reptiles (-1.0441 and 8.4831) and the insect species (-1.1357 and 6.5977). The mammals, amphibian and the reptile species were largely depleted as a result of over exploitation. Participatory resources management between the various stakeholders is therefore recommended to ensure the sustainable conservation of wildlife resources in the area.

Key words: Biodiversity, Conservation, Community Forest, Participatory management

Introduction

A community forest is a natural or modified ecosystem containing significant biodiversity values and ecological services, voluntarily conserved by indigenous and local communities, through customary laws or other effective means (Corrigan and Granziera, 2010). Impoverishment of the society, progressive soil erosion, introduction of other school of thoughts and monotheist religions are some of the forces opposing the practice of traditional rites judge to be diabolical have contributed to the weakening of the sacred forest management in the country therefore threatening their existence (WRM, 2006).

Presently, the earth is undergoing the Holocene mass extinction (WRM, 2006), an era of unprecedented number of species extinction. Habitat loss and fragmentation are the two main contributors to biodiversity decline across the landscape. Human influence over the earth's ecosystem has been so extensive within the last ten decades (Caughley and Sinclair 2004), thus scientist have difficulty in estimating the total number of species lost in the era, implying the rate of deforestation, reef destruction, wetlands filling among others are proceeding much faster than assessment of the

earth's species (Caughley and Sinclair 2004). It has been estimated that the year 2050, 15 to 30 percent would become extinct (Chris and Alison, 2004).

In Nigeria prolonged deforestation, poaching and wildlife habitat loss has seriously depleted, threatened and endangered fauna diversity resources across the country (Aremu and Elekhizor, 2009; Happold, 2000). To achieve the goal of maintaining all naturally occurring species in viable populations, both general and specific activities must be included in the basic strategy for maintaining biodiversity. As the biodiversity concept also covers genetic and ecosystem diversity, as well as ecological processes, the most efficient strategy must be to preserve as much as possible of the original forests and to initiate the dynamics, structure and function of the natural ecosystems in a given region (Aremu and Elekhizor, 2009; Sjoberg and Lennartsson, 1995), thus, there is the need to estimate the remaining fauna resources in an ecological zone to be able to design and develop appropriate management principle for the conservation of the available wildlife resources. This study was therefore aimed at assessing the fauna composition of the study

area using species diversity and richness indices for computation.

Materials and Methods

Study Area

Ikot Ondo Community forest lies between latitudes 5°00'N and 5°15'N and longitude 7°35'E and 7°45'E with an area of about 50km². The forest is a lowland rainforest located in Adiasim, Essien Udim in Akwa Ibom State, Nigeria. The forest has a surface drainage with an average annual rainfall of 2000mm – 3000mm. The topography is moderately plane with little or no ridge or valley.

Survey Method

Wild fauna were identified and enumerated along the 2 straight line transects of 1.4km laid in the forest as recommended by Jean and Pierre, 1990; Walsh and White, 1999). Only direct technique of animal counting was used for the survey, transect were allowed for four days after clearance before data collection was commenced. This was to allow for animals to return to the initial range. Transects were transverse severally between the hours of 7.00 to 12.00 and 14.00 to 16.00 with average walking speed of 1km/hr. periods of working were interspersed with periods of silent and watch to increase possibility of detecting animals that might hide or flee upon the approach or movement of the observers (Buckland *et al.*, 1993; Aremu and Elekhizor, 2009). Zeis Dialyt (10×40) Binoculars were used to observe and detect presence of wild fauna. The following assumptions were employed during the survey; animals on the transects were detected with certainty, no animals falling on or over the transects were missed, animals were detected at their initial location and all animals have equal probability of being counted (Seber, 1982). Fauna species were identified and enumerated as recommended by Mark and Grant (1989).

Biodiversity parameters of wild fauna were measured according to Magurran (1988) as follows;

$$F_k = \sum Y_i/n \times 100 \quad (1)$$

$$H^1 = \sum P_i \log P_i \quad (2)$$

$$D = S - 1/\log n \quad (3)$$

Where: F_k – frequency, Y_i – incidence of species k in site I , n – number of species sampled, H^1 – diversity index, P_i – proportion of individuals for i th species out of the total number of individuals, \log – natural log, D – species richness, S – number of species.

Data collected were subjected to 'T-test' at ($p > 0.05$) significant level as recommended by Alika (2006). The study was conducted between the months of February 2008 and October 2008.

Results and Discussion

Fauna biodiversity

A total of 41 wildlife families including *Viverridae*, *Bovidae*, *Feliadae*, *Thrynomidae*, *Phasianidae*, *Columbidae*, *Bufonidae*, *Leptodactylidae* and *Turtricidae* among others representing 74 fauna species including *Viverra civeta*, *Felis libyca*, *Neotragus batasi*, *Mesopicos goertae*, *Connyris cupreus*, *Rana utriculata* and *Valanga nigricornis* were recorded in Ikot Ondo Community forest. The fauna diversity and richness indices for mammals were -1.1914 and 12.5174 respectively (Table 1). The fauna diversity index and species richness for avian fauna species were -1.2985 and 11.6246 respectively (Table 4) while the fauna diversity and richness indices for amphibian and reptile were -1.0441 and 8.4831 respectively (Table 2). Furthermore, the fauna diversity and species richness indices of insects recorded were -1.1357 and 6.5977 respectively (Table 3).

The higher value of avian fauna species over other fauna species in the study area can be attributed to the availability of food and the forest formation makes a good cover for them to breed and forage (Li and Martin, 1991). Also abundant is the insect species. The forest ecosystem favored their abundance as a result of the abundance of flowers, fresh leaves, as well as wild forest fruits. Their population was controlled by the presence of predators such as the avian and amphibian species. The amphibian, reptile and mammals species recorded lower indices because of the high rate of poaching and habitat fragmentation in the area. The uncontrolled exploitation and reduction in vegetation biomass, total loss of

wildlife habitat, breeding space and food base for wildlife population thereby reduces the wildlife biodiversity and richness of the study area (Aremu and Elekhizor; 2009; Ogogo, 2008; Meijaard and Sheil, 2007; Marguba, 2002; Fimbel *et al.*, 2001).

Conclusion and Recommendation

Human activities have been blamed for the extinction of many wildlife species through unsustainable natural resources exploitation and habitat destruction. The population of wildlife species in the study area has greatly been depleted as a result of destruction of their habitat for agricultural related activities resulting in habitat fragmentation, degradation, and increased rate of poaching in the area as a means for income generation. It is therefore recommended that measures to foster partnership between the community and other stakeholders in natural resources conservation in the area be implemented to ensure the sustainable natural resources management in the area. There is also the need for the provision of alternative means of livelihood for the local populace to reduce their rate of dependence on the available resources of the forest. Furthermore, afforestation and re-afforestation programs should be timely carried out to rehabilitate the degraded ecosystem.

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Table 1 Checklist of mammal species in Ikot Ondo Community forest

Family	Mammal species	Frequency (%)	$P_i \log P_i$
<i>Bovidae</i>	<i>Cephalopus spp</i>	3.38	-0.0497
	<i>Neotragus batasi</i>	1.69	-0.0299
<i>Vevevridae</i>	<i>Viverra civeta</i>	5.93	-0.0727
	<i>Atilax paludinosus</i>	7.62	-0.0852
	<i>Genetta poensis</i>	2.54	-0.0727
<i>Feliadae</i>	<i>Felis libyca</i>	0.84	-0.0174
<i>Anomaluridae</i>	<i>Anomalurus becrofti</i>	5.93	-0.0727
<i>Cricetidae</i>	<i>Cricetomys gambianus</i>	10.16	0.1010
<i>Muridae</i>	<i>Rattus rattus</i>	11.01	-0.1055
	<i>Myomys daltonii</i>	6.78	-0.0792
<i>Hystriidae</i>	<i>Atherurus africanus</i>	3.38	-0.0497
<i>Thrynomidae</i>	<i>Thryonomys swinderianus</i>	7.62	-0.0852
<i>Sociuridae</i>	<i>Xerus erythropus</i>	6.78	-0.0792
	<i>Crocidura flavescens</i>	2.54	-0.0405
<i>Pteropodidae</i>	<i>Epomops franqueti</i>	9.32	-0.0960
<i>Nycteridae</i>	<i>Nycteris spp</i>	6.78	-0.0792
<i>Vesperitillionidae</i>	<i>Pispistrellus nanus</i>	3.38	-0.0497
<i>Molossidae</i>	<i>Tadarida nigeriae</i>	4.23	-0.0581
Total		100	-1.1914

Mammal diversity indices -1.1914, richness 12.5174

Table 2 Checklist of amphibian and reptile species in Ikot Ondo Community forest

Family	Amphibian and reptile species	Frequency (%)	$P_i \log P_i$
<i>Leptodactylidae</i>	<i>Eleutherodactylus</i>	4.65	-0.0619
	<i>planirostris</i>		
<i>Microhylidae</i>	<i>Gastrophyrne carolinensis</i>	5.81	-0.0718
<i>Pelobatidae</i>	<i>Scaphlopus holbrookii</i>	4.65	-0.0619
<i>Ranidae</i>	<i>Rana capito-sevosa</i>	6.97	-0.0806
	<i>Rana utriculata</i>	2.37	0.0385
	<i>Rana sylvatica</i>	2.37	-0.0385
<i>Bufo</i>	<i>Bufo terrestris</i>	10.46	-0.1025
<i>Polychridae</i>	<i>Anolis cardinensis</i>	2.37	-0.0385
	<i>Anolis sagrei</i>	2.37	-0.0385
<i>Agamidae</i>	<i>Agama agama</i>	20.95	-0.1421
<i>Scincidae</i>	<i>Sciencella lateralis</i>	22.09	-0.1449
<i>Colubridae</i>	<i>Carphophis spp</i>	2.37	-0.0385
	<i>Coluber spp</i>	3.49	-0.0508
	<i>Opheodrys aestivus</i>	4.65	-0.0619
	<i>Farancia spp</i>	1.16	-0.0224
	<i>Tantilla coronata</i>	3.49	-0.0508
Total		100	-1.0441

Amphibian and reptile diversity indices -1.0441, richness 8.483

Table 3 Checklist of insect species in Ikot Ondo Community forest

Family	Insect species	Frequency (%)	$P_i \log P_i$
<i>Acrididae</i>	<i>Camnula pellucid</i>	5.23	-0.0670
	<i>Melanoplus sanquinipes</i>	6.53	-0.0773
	<i>Valanga nigricornis</i>	8.16	-0.0888
<i>Cleridae</i>	<i>Enoclerus lecontei</i>	6.21	-0.0749
	<i>Thanasimus dubius</i>	6.21	-0.0749
<i>Eurytomidae</i>	<i>Eurytoma spp</i>	6.21	-0.0749
<i>Formicidae</i>	<i>Formica exsectoides</i>	10.78	-0.1043
<i>Cicadidae</i>	<i>Magicicada septendecim</i>	6.53	-0.0773
	<i>Okanagana synodica</i>	6.21	-0.0749
	<i>Tibicen canicularis</i>	7.51	-0.0844
<i>Curculionidae</i>	<i>Naupactus spp</i>	6.53	-0.0773
	<i>Otiorhynchus sulcatus</i>	6.21	-0.0749
<i>Turtricidae</i>	<i>Petrova albicapitana</i>	5.55	-0.0697
	<i>Steremnius carinatus</i>	9.15	-0.0950
Total		100	-1.1357

Insect diversity indices -1.1357, richness 6.5977

Table 4 Checklist of avifauna species in Ikot Ondo Community forest

Family	Avifauna species	Frequency (%)	$P_i \log P_i$
<i>Phasianidae</i>	<i>Francolinus bicalcaratus</i>	2.17	-0.0360
<i>Ardeidae</i>	<i>Nycticorax nycticorax</i>	4.55	-0.0610
	<i>Ardea cinerea</i>	6.72	-0.0788
<i>Aegypiidae</i>	<i>Necrosyrtes monachus</i>	6.29	-0.0755
<i>Accipitridae</i>	<i>Milvus migrans</i>	3.47	-0.0506
	<i>Kanpifolco monogrammicus</i>	3.25	-0.0483
<i>Columbidae</i>	<i>Stigmatopella senegalensis</i>	5.20	-0.0667
	<i>Teron australis</i>	3.47	-0.0506
	<i>Streptopelia turtur</i>	1.95	-0.0333
<i>Cuculidae</i>	<i>Clamator levaillanti</i>	1.73	-0.0305
	<i>Lampromorpha caprius</i>	7.16	-0.0437
<i>Caprimulgidae</i>	<i>Scotornis climacurus</i>	7.16	-0.0820
<i>Apodidae</i>	<i>Colleoptera affinis</i>	6.07	-0.0738
	<i>Cypsiurus parvus</i>	0.86	-0.0177
<i>Bucerotidae</i>	<i>Lophoceros nasutus</i>	4.77	-0.0630
<i>Picidae</i>	<i>Mesopicos goertae</i>	0.86	-0.0177
<i>Nectariniidae</i>	<i>Hedydipna platura</i>	9.54	-0.0973
	<i>Connyris cupreus</i>	6.29	-0.0755
	<i>Anthreptes collaris</i>	6.29	-0.0755
	<i>Connyris coccinigaster</i>	6.50	-0.0771
<i>Corvidae</i>	<i>Corvus albus</i>	5.20	-0.0667
	<i>Ptilostopelia turtur</i>	1.95	-0.0333
Total		100	-1.2985

Avifauna diversity indices -1.2985, richness 11.624