
A SURVEY OF THE WILD AVI-FAUNA WITHIN MAKURDI METROPOLIS OF BENUE STATE, NIGERIA.

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ABSTRACT

A survey of the wild Avi-fauna within Makurdi Metropolis was undertaken during the dry and rainy seasons of 2007-2008. The method adopted in data collection was total count of birds and trees in ten (10) selected streets in the six built-up areas of the town. A total of 2,192 birds belonging to 18 species were identified during the dry season, while 745 birds belonging to 29 different species were counted during the wet season. Six species were permanent resident, found both during the wet and dry seasons, 12 species occurred only during the dry season while 23 species were found only during the wet season. Bird population does not correlate ($r = 0.005$) with either tree density or diversity. Birds were found to utilize habitats such as roof tops, electric poles and wire, and television antenna. The study concludes that wild birds still migrate in and out of the town in spite of urbanization and that urbanization may indeed have provided favourable sites for some bird species.

Key words: Avi-Fauna, counts, diversity, urbanization

INTRODUCTION

Birds have a worldwide distribution, penetrating even the remotest deserts, oceans, forests and mountains. They are the most conspicuous group in the Animal Kingdom (Afolayan, 1993), and Africa is blessed with many species of birds scattered throughout the different ecological regions of the continent. According to Read (1999) birds form a very important component of biodiversity and are good indicators of habitat quality. Many species of birds are highly nomadic, flying long distances to take advantage of better conditions in temporary locations (Norman, 1979; Brigg's 1992). Read (1999) state that food availability, suitable breeding and protective cover are the key factors governing habitat selection in birds.

Many species are endangered due to habitat destruction (Fox and Madsen, 1997), inadequate food resources and lack of

partners (Maricela and Pascual 1996). Humans change the environment in a number of ways, for instance changing water courses, draining wetlands, urbanization and practices that promote erosion and desertification. All these lead to areas becoming unsuitable for birds that previously occurred in that area (Parody *et al*, 2001). Large areas of cultivated grain fields are providing food sources for granivorous birds, while tree plantations are providing suitable habitats for some tree dwelling birds in areas where they did not previously exist. Urbanization is also providing additional habitats for a number of species in areas with an otherwise flat topography (Hockey, 2003). The changing environment is making birds to move away from habitats that have become unsuitable, expanding their ranges in areas that have become more suitable. Mac Anthony (1961) stated that vegetation structure affects bird's communities while Hooper *et al* (1975) noted the influence of vegetation cover, particularly

shrubs and canopy layers, on the diversity of birds in sub-urban areas. However, the volume of foliage is significantly less in towns for all layers and may be a critical resource that limits density and diversity, nest placement and predator avoidance and escape. The objective of this study is to identify bird species that roost in different habitat within Makurdi Metropolis and compare their seasonal population changes.

MATERIALS AND METHODS

Bird census was carried out with the help of a 10 x 50 binocular, a Zeno camera with a zoom lens, a measuring tape and a field guide "Birds of West Africa" by Serle *et al* (1992) for identification of birds.

Study area

Makurdi Metropolis lies within lat 07° 49' and 07° 52'N and long 08° 36' and 08° 40'E, with an area of about 16km² (Udo, 1981). The town is naturally divided into two land masses by River Benue into North and South Banks. The South Bank is further divided (politically) into Wurukum, High Level, Wadata, Ankpa Quarters and Old GRA (Government Reserve Area). Census was carried out in these six areas. Makurdi has a typical tropical climate

with clearly distinct dry and rainy season. Dry season commences from November to March while rainy season starts from April and ends in October and ranges between 150-180cm. Temperature fluctuate between 23°C during the rainy season to as much as 38°C during the dry season (Udo, 1981).

Data collection

This study was carried out in the six built-up parts of the town; and 4 streets were purposively selected in each of the six areas. A 500m line transect was laid in each of the areas for the purpose of bird census. Bird identification and census were carried out between 7.00 11.00hr and 16.00 18.00hrs. Photographs of Birds were also taken for easy identification. Tree species in each of the sampled areas were identified for both seasons. The data was analyzed using percentages, Shannon Wiener diversity index, correlation coefficient (r^2) and Chi-square test of differences in percentages (χ^2).

RESULTS

Table 1: Check list of birds' species and their Relative abundances as identified during the dry and rainy seasons.

SCIENTIFIC NAME BIRD SPECIES	FAMILY	COMMON NAME	% DRY SEASON	% WET SEASON
<i>Streptopelia senegalensis</i>	Columbidae	Laughing Dove	27.3	8.19
<i>Ptilostomus afer</i>	Corvidae	Black Magpie	9.17	-
<i>Crinifer piscator</i>	Musophagidae	Grey Plantain Eater	7.07	1.21
<i>Centropus senegalensis</i>	Cuculidae	Senegal Coucal	1.97	2.28
<i>Trochocecus albiventris</i>	Sylviidae	White Belied flycatcher	22.11	-
<i>Corvinella corvine</i>	Laniidae	Long Tailed Shrike	4.11	0.94
<i>Apus cafer</i>	Apodidae	White Rumped Swift	3.46	-
<i>Estrilda bengala</i>	Estrildidae	Red CheckedCordon Bleu	9.21	0.54
<i>Streptopelia decipiens</i>	Columbidae	Mourning Dove	2.14	1.88
<i>Glaucidium perlatum</i>	Strigidae	Pearl Spotted Owlet	0.19	-
<i>Milvus migrans</i>	Accipitridae	Black Kite	0.19	-
<i>Phoeniculus aterrimus</i>	Upupidae	Lesser wood hopper	6.92	-

<i>Lybius dubius</i>	Capitonidae	Bearded barbet	0.27	-
<i>Bulbucus ibis</i>	Ardeidae	Cattle egret	0.27	-
<i>Accipiter africana</i>	Accipitridae	West African goshawk	0.19	-
<i>Actophilornus africana</i>	Otididae	Lily Trotter	0.18	-
<i>Nectarinia chloropygia</i>	Nectarinidae	Scarlet Breasted Sunbird	0.68	-
<i>Nectarinia cuprea</i>	Nectarinidae	Copper Sunbird	4.15	-
<i>Pynonotus barbatus</i>	Pynonotidae	Common Garden bulbul	-	22.4
<i>Riparia paludicola</i>	Hirundinidae	African Sand Martin	-	6.58
<i>Laniarius leucorhynchus</i>	Lanidae	Sooty Bouhou	-	2.01
<i>Lanius colani</i>	Lanidae	Fiscal Shrike	-	0.54
<i>Psalidoprocne obscuria</i>	Hirundinidae	Fanti rough winged swallow	-	2.01
<i>Treron waalia</i>	Columbidae	Yellow Bellied Fruit pigeon	-	0.81
<i>Agapornis pullaria</i>	Psittacidae	Red Headed Love Bird	-	0.54
<i>Turtur tympanistria</i>	Columbidae	Tambourine Dove	-	0.67
<i>Cercotridis podobe</i>	Turdidae	Black Scrub robin	-	0.27
<i>Acrocephalus rufescens</i>	Sylviidae	Rufus cane warbler	-	0.81
<i>Muscicapa aquatica</i>	Muscicapidae	Swamp Flycatcher		
<i>Oriolus brachyrhynchus</i>	Oriolidae	Black Headed Oriole	-	0.27
<i>Phyllastrephus</i>	Flarostritus	Yellow bellied greenbul	-	0.40
<i>Myrmecocichla albifrons</i>	Turdidae	White fronted black chat	-	1.61
<i>Motacilla aguimp</i>	Motacillidae	African pied wagtail	-	0.40
<i>Vidua macroura</i>	Ploceidae	Pin-tailed whydah	-	0.54
<i>Columba unicincta</i>	Columbidae	Grey Wood Pigeon	-	0.94
<i>Nigrita fusconota</i>	Estrildidae	White breasted black finch	-	0.27
<i>Smithornis capensis</i>	Eurylaemidae	Black Capped Broadbill	-	0.40
<i>Eupletes macrourus</i>	Ploceidae	Yelooow Mantled Whydah	-	0.13
<i>Ploceus melanocephalus</i>	Ploceidae	Black Headed Weaver	-	41.3
<i>Pirenestes ostrinus</i>	Estrildidae	Seed Cracker	-	0.81
<i>Cypsiurus parvus</i>	Apodidae	Palm Swift	-	0.54
			100	100

TABLE 2: Tree species identified in the study area, with their Relative abundances

PLANT SPECIES	%	%	%	%	%	%
	WADATA	GRA	HIGH LEVEL	ANKPA QUARTERS	NORTH BANK	WURUKUM
<i>Parkia biglobosa</i>	0.19	1.45	0.47	3.87	0.00	0.33
<i>Cocos nucifera</i>	7.35	2.10	5.45	4.65	0.00	3.32
<i>Anacardum oxidentate</i>	1.35	2.90	2.13	4.13	10.18	4.64
<i>Ficus syncromorus</i>	0.35	0.00	0.00	0.00	0.00	1.33
<i>Eucalyptus trioreana</i>	0.56	1.29	0.24	1.81	1.57	0.66
<i>Albizia lebeck</i>	1.32	0.94	8.53	4.13	1.17	0.83
<i>Daniella oliveri</i>	0.19	1.45	0.43	0.76	0.00	0.33
<i>Ceiba pentandra</i>	1.51	0.00	0.00	0.26	0.00	1.89
<i>Gmelina arborea</i>	2.07	5.32	3.32	3.62	1.96	1.99
<i>Azadiracta indica</i>	6.40	25.16	7.58	24.55	11.55	0.99
<i>Ficus thonningii</i>	14.88	0.00	1.18	2.58	14.87	20.90
<i>Mangifera indica</i>	12.99	15.97	12.32	13.95	20.94	20.90
<i>Delonix regius</i>	2.82	8.71	7.35	4.13	4.31	3.65
<i>Citrus sienensis</i>	2.82	2.74	6.40	2.84	3.33	5.31
<i>Terminalia catappal</i>	16.38	2.50	8.29	0.00	4.70	2.65
<i>Elaies guinensis</i>	13.56	15.97	12.09	18.09	10.37	26.87
<i>Newbouldia levis</i>	6.59	3.23	8.29	0.00	6.07	10.78
<i>Tectona grandis</i>	0.00	0.48	1.42	4.91	1.51	1.33
<i>Carica papaya</i>	3.95	3.23	4.98	0.78	4.12	6.63
<i>Psidium gujava</i>	1.69	0.00	2.61	4.91	0.98	2.82
<i>Viteleria paradoxa</i>	0.00	0.16	0.00	0.00	0.39	0.00
<i>Leacena leacocephala</i>	2.26	0.00	6.87	0.00	1.96	0.00
<i>Euchalyptus citrodora</i>	0.56	0.00	0.00	0.00	0.00	0.00
	100	100	100	100	100	100

Table 3: Tree species diversity indices in the six sampled sites within Makurdi Metropolis.

LOCATION	PROPORTION OF EACH TREE SPECIES	TREE DIVERSITY INDEX
North Bank	0.2490	0.399
Wadata	0.1466	0.122
Old GRA	0.2046	0.141
Ankpa Quarters	0.1638	0.129
Wurukum	0.0696	0.081
High Level	0.3608	0.159

Table 4: Tree density in the six samples zones within Makurdi Metropolis.

LOCATION	TOTAL NUMBER OF TREE SPECIES	DENSITY/m²
North Bank	364	0.011
Wadata	214	0.009
Old GRA	261	0.010
Ankpa Quarters	235	0.009
Wurukum	189	0.007
High Level	185	0.007

Table 5: Correlation of number of trees species in each zone to the total number of Bird species

LOCATION	CORRELATION COEFFICIENT (r²)
North Bank	-0.225
Wadata	0.068
Old GRA	0.264
Ankpa Quarters	0.934
Wurukum	-0.282
High Level	0.552

Table 6: Bird species diversity indices in the six sampled sites within Makurdi Metropolis during the dry and rainy season.

LOCATION	BIRD DIVERSITY INDICES DRY SEASON	BIRD DIVERSITY INDICES RAINY SEASON
North Bank	0.0098	0.0202
Wadata	0.0226	0.1888
Old GRA	0.0451	0.0242
Ankpa Quarters	0.0308	0.0133
Wurukum	0.0081	0.0101
High Level	0.0738	0.0024

Table 7: The percentage of habitat utilization by birds in the six sample sites during the dry season.

	HIGH LEVEL	OLD GRA	WADATA	ANKPA QUARTERS	NORTH BANK	WURUKUM
<i>Mangifera indica</i>	-	-	-	-	-	0.87
<i>Elaes guenensis</i>	3.65	0.73	-	0.64	1.46	0.64
<i>Cocos nucifera</i>	2.19	-	-	0.50	-	1.23
<i>Albizia lebbeck</i>	0.32	0.73	0.14	0.14	-	1.18
<i>Eucalyptus</i>	0.73	-	-	0.18	-	-
<i>trioreria</i>						
<i>Parkia biglobosa</i>	1.42	0.18	-	0.96	-	-
<i>Terminalia</i>	2.92	0.68	1.42	0.82	-	-
<i>catappal</i>						
<i>Azardica indica</i>	-	3.06	0.55	4.02	2.01	-
<i>Ceiba pentandra</i>	-	-	-	0.05	-	-
<i>Psidium gujava</i>	-	-	-	0.75	-	-
<i>Anacardium Spp</i>	-	-	0.23	-	-	-
<i>Ficus thoningii</i>	-	-	-	-	0.91	-
<i>vetelaria</i>	-	-	-	-	0.05	-
<i>paradoxa</i>						
<i>Citrus sienensis</i>	-	0.36	-	-	-	-
<i>Gmelina arborea</i>	-	1.73	-	-	-	-
<i>Delonix regia</i>	-	1.92	-	-	-	-
<i>Tectona grandis</i>	-	0.46	-	-	-	-
<i>Carica papaya</i>	-	-	-	-	-	-
<i>Electric poles</i>	5.25	4.07	4.29	4.29	3.06	3.43
<i>House roof</i>	1.35	2.60	2.42	1.60	0.59	0.50
<i>Ground</i>	3.60	2.79	4.16	3.15	1.87	1.55
<i>Antenna</i>	-	1.96	-	-	-	-
<i>Grasses</i>	4.34	-	1.87	-	-	-
Total No of Species	10	13	8	12	7	7

Table 8: Percentage of habitat utilization by Birds in the six sampled sites during the wet season.

HABITAT	HIGH LEVEL	OLD GRA	WADATA	ANKPA QUARTERS	NORTH BANK	WURUKUM
<i>Ficus benjaminus</i>	-	-	-	1.48	-	2.30
<i>Vittelaria paradoxa</i>	-	-	-	-	2.83	-
<i>Daniella oliveri</i>	-	-	1.46	-	1.22	-
<i>Gmelina arborea</i>	-	-	-	-	1.48	-
<i>Psidium gujava</i>	-	-	-	0.67	1.08	-
<i>Eucalyptus spp</i>	-	-	-	-	0.95	-
<i>Electric poles</i>	2.97	3.37	1.35	1.88	5.27	2.30
<i>Roofs</i>	-	1.35	-	0.94	0.27	1.22
<i>Ground</i>	-	-	3.38	1.08	0.67	1.42
<i>Azadiracta indica</i>	-	4.05	-	3.10	0.40	-
<i>Albizia lebbeck</i>	-	-	-	-	-	2.55
<i>Polyanthia longifolia</i>	-	2.02	-	-	-	0.54
<i>Saraca judica</i>	-	1.35	-	0.81	-	0.40
<i>Delonix regius</i>	-	-	-	1.62	-	-
<i>Moringa oleifera</i>	-	0.41	-	-	-	-
<i>Thuja pliacata</i>	-	1.08	-	-	-	-
<i>Mangifera indica</i>	0.40	-	2.97	-	-	-
<i>Carica papaya</i>	-	-	1.62	-	-	-
<i>Cocos nucifera</i>	0.54	-	3.86	-	-	-
<i>Parkia biglobosa</i>	-	-	1.46	-	-	-
<i>Terminalia catapal</i>	1.08	-	-	-	-	-
<i>Elais guinensis</i>	-	-	0.81	-	-	-
Total No of Species	4	7	8	8	9	7

DISCUSSION

The relationship of birds to features of their habitat has been a major focus of study in avian ecology; perhaps because some aspects of habitat use are so conspicuous in birds. In this study, 2,193 birds in 18 species identified in dry season and 745 birds in 28 species identified in rainy season showed activities that reflected a process of habitat exploitation. This observation is not at variance with the finding of Poulin and Mc Neil (1993) in Venezuela, where both of them worked on habitat use by birds. A seasonal fluctuation in

bird species abundance suggests that seasonal variation was caused mostly by movement of individual with the habitat, since all food types showed marked temporal variation.

In the dry season many bird species were found in the GRA and Ankpa Quarters which is due to food resources availability as there are more trees that bear flowers and fruits for the birds to feed on. But during the rainy season, most of the tree species in Makurdi Metropolis became luxuriant, producing fruit and flowers as food resources for birds. This account for even distribution and utilization

of all the habitat by the bird species in this reason. Bird species that face seasonal irregularity of food resources have to emigrate to area where food is available, but some species, like the laughing dove, grey plantain eater, Senegal Coucal, long tail shrike, checked cordon bleu and mourning dove, that were present all year round suggests the adoption of a generalist feeding strategy.

BSD, doubles in the rainy reason in all the zone except for GRA and High Level which agrees with the findings of Norman (1979) and Briggs (1992) that high BSD in the rainy season could be attributed to food availability and suitable breeding site as well as protective cover which are the factors governing habitat selection in birds.

Urbanization is providing additional habitats for a number of species and this is true, as birds were found utilizing electric poles, cables, television antenna and roof tops, a finding that is not at variance with the observation of Hockey (2003). In this study, tree diversity and density does not correlate with bird distribution and abundance as one will expect. North Bank which has the highest tree diversity and density of 0.399 and 0.011 respectfully has a correlation of 0.225.

Even though human activities affect bird population by destroying their natural habitat, the birds still create new habitats which they find suitable. The differing relative abundances of bird species in different zones of the Metropolis at different time of the year can only be explained in terms of species habitat behaviour and not on the structure of the habitat itself.

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