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BIRD SPECIES (AVIFUANA) COMPOSITION AND DISTRIBUTION IN PANDAM WILDLIFE PARK, PLATEAU STATE, NIGERIA

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ABSTRACT

The survey was carried out to provide an update on wild birds' species in the Park. Ten (10) transect lines of 500metres each were established in the terrestrial ecological zone of the park at an interval of 50metres apart, and observation at swampy/ dykes along the edge of Pandam lake. Data were collected by carefully walking through the dykes and along the transect lines. Data were analyzed using paired t-test, non-paired t-test and independent t-test for the diversity between terrestrial and aquatic birds. A total of fifteen birds' species of 13 families were encountered. The birds' composition was more in the terrestrial 2,242 against 1,736 for aquatic area. *Motocilla flava* was dominant, while *Tackus erthrorhynchus* was the lowest at the terrestrial zone and *Ardeola ibis* was dominant and *Ceryle rudis* the least at the aquatic zone. The family Ploceidae was the highest and the least was corvidae. Birds were however, more in the dry season of the survey. The birds observed were mainly local resident species; Such as *Actophilormis africana*, *Clamator Jacobimis*, *Centropus Senegalensis*, just to mention a few. However, there was no significant difference in the number of species at both habitats. Conservation awareness and community participation is paramount.

1. Introduction

Wildlife including birds dwells in a natural environment or habitat. They may be in one form or possess some genetic variation forming parts of the biodiversity in a zone/habitat. Their interactions with a variety of other living forms provide man with some essential services such as food production, soil fertility, climate regulation, and carbon storage (which has become the hallmark of human-wellbeing). Unfortunately, for each day, an estimated species of Wildlife birds disappear, mainly due to human activities and population growth (Julliard et al., 2003; Miller et al., 2003; Manu et al., 2007; Tropical Forest update, 2010). Mixed habitats (Forest and Savanna), harbor an estimated two-third of all terrestrial bird species, as well as a fascinating array of ecological processes. However, destruction of the bio-resources has diminishing effects on their population in most parts of Africa and

Nigeria in particular. This dangerous habit is accelerating more as the demand for fuel wood and timber is overgrowing over the years even into protected areas like the Pandam Wildlife Park (PWP).

Generally, avifauna is referred to bird species. Birds are vertebrates, possessing wings and lay eggs belonging to the kingdom: animalia; phylum: chordata and class: Aves. They co-habit around oceans, rivers, mountains and forests. Some are brightly coloured, possess distinct songs, calls and showy displays which add touristic value to human life. They also display social behavior such as cooperative breeding and hunting, flocking and mobbing of predators. In Nigeria, many bird species are scattered throughout the various ecological zones including Parks and Nature Reserves.

Most importantly, birds are used as tools for environmental monitoring. They serve as good biological indicators for our biodiversity (Sivaperuman and Jayson, 2006). This is so as their disappearance becomes a bad omen to our environment, indicating that an action must have to be taken. Also they are essential factors in environmental contaminant and air pollution in any given area. Birds, therefore detect changes in the environment which cannot be detected or observed by physical control e.g they consume mosquitoes, beetles and stem borers which are pests. Moreover, humming birds pollinate various nectar-producing plants, transport pollen on their beaks and feathers from one flower to another as they eat fruits and swallow the seeds of plants. When they dispose of their waste, the seeds are disposed along with it (Labe et al, 2018).

Birds' population reduction and extinction might result to disruption of ecosystem processes that are of great importance to man. Anderson et al., (2006) maintained that when district ecosystems such as forest, savanna, and wetlands are destroyed, the ecological roles of birds often disappear with them. This trend may continue unabated to the nearest future. The objective of this research was to determine the birds species composition (richness) and distribution found in Pandam Wildlife Park (PWP).

2. Materials and Methods

2.1 The Study Area

Pandam wildlife park (PWP) situated in Qu'apam local Government Area of plateau state, Nigeria, lies between latitudes 8o 35' N and 8o 55' N, and longitudes 8o 00' E and 10o 00' E (Akosim et al. 2007), within the Northern Guinea Savanna (Fig. 2), established in 1972. It is bounded on the East by Namu and Kayarda towns, on the West and North, by the Dep River and on the South by Aningo, Pandam and Nasukuuk towns. The park covers a total area of 224sq.km (Ezealor, 2002). The terrain slopes gradually southwards and forms a basin, the pandam Y- shaped lake, a wetland complex of approximately 2km2 (Audu and Shola, 2016). Major vegetation types of the Park include wooded Guinea Savannah comprising Afzelia africana, Vitellaria paradoxum and Parkia biglobosa. A riparian vegetation mostly observed along the many smaller rivers that form tributaries to the lake and all along the banks of the Pandam lake with the presence of Elais guinensis, Berlina grandiflora and Bosqueia angolense. Marshlands form an open continuous wetland separating the lake and the Savannah vegetation. The two major features of the climate of the Park are divided into wet and dry seasons and the variability from year to year due to climate change. The wet season extend from April to October, while the dry season extends from November to March and annual rainfall in the Park is between 1,000 – 1,500 mm per annum (Ezealor, 2002).

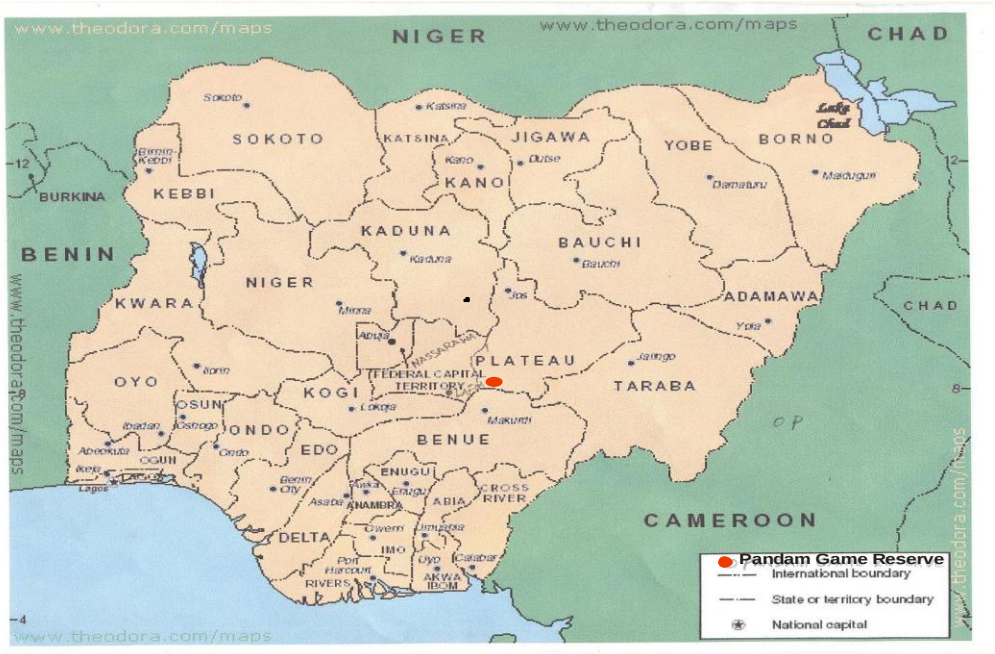

Fig.1: Map of Nigeria showing the Plateau State, location of Pandam Wildlife Park.

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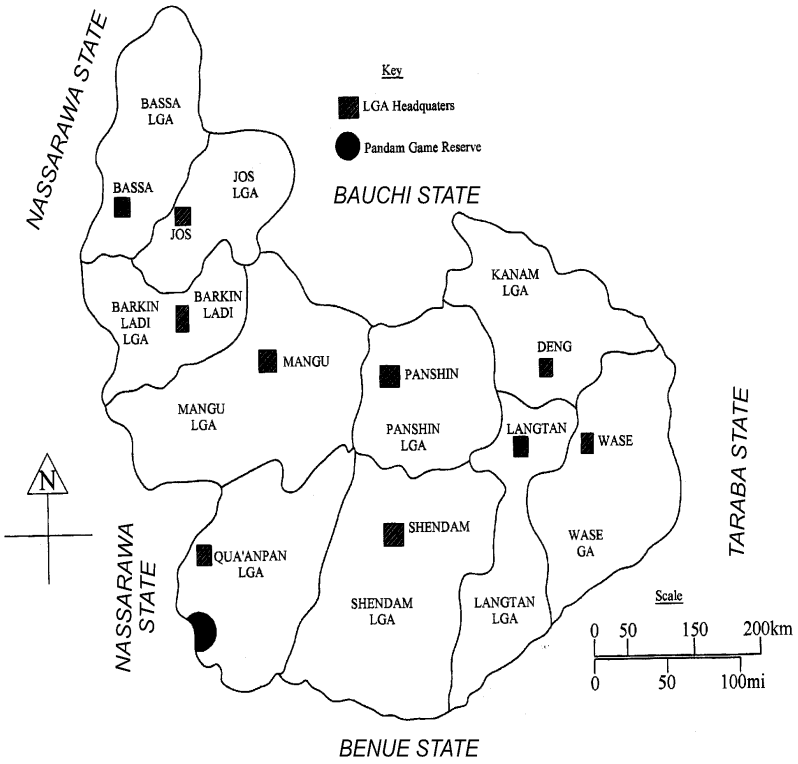

Fig.2: Map of Plateau State showing the location of Pandam in Qu'apam local Government Area.

2.2 Data Sampling and Collection

The line transect method as described by Bibby et al., (2000) was adopted for the survey. Ten (10) transect of 500m each and interval of 50m apart were laid in the guinea wooded savanna and

observation along the lake. The transects were visited twice weekly and two times daily in the morning between 6:00 to 10:00am and evening between 4:00pm and 6:00pm, for dry and rainy seasons (October-late March) and (early April-late September) respectively. During each visit transects were walked slowly, and same at the riparian forest along the Pandam lake along the edges (dyke) of the lake recording/detecting the bird species seen.

Points Survey were mark the aid of a GarminTM 12 Geographic Positioning System (GSP). Birds were identified with the aid of a pair of binocular (Barska 8 × 32 with 8MP Digital camera) while voice recorder (Sony digital voice recorder) used for calls and later played back to confirm through the call of birds downloaded. A field guide book on West African Birds by Borrow and Demey, (2008) was used for birds' categorization.

2.3 Data Analysis

Data were analyzed using paired t-test, non-paired t-test and independent t-test for the diversity between terrestrial and riparian/aquatic birds. Frequency and percentage were used to estimate the relative abundance of each species.

Relative Abundance = Number of individual species

Total number of all the species 100

3. Results

A total of 13 families species of birds were observed in the terrestrial (Savanna woodland/ riparian) and aquatic (lake) ecological zones of the Park (Table 1). The family Ploceidae was the highest with (20.75%), followed by Ardeidae (20.51%), and while the two least occurred families was Rallidae with (0.80%) and Corvidae (0.74%). However, there was no significant difference between the morning and evening observations.

Table 1: Average number of birds by families encountered in the Park (Morning and Evening).

S/n	Family	Morning	Evening	Frequency	Percentage (%)
1.	Ploceidae	398	428	826	20.76
2.	Ardeidae	384	432	816	20.51
3.	Columbidae	226	294	520	13.07
4.	Accipitridae	186	200	386	9.70
5.	Cuculidae	158	194	352	8.85
6.	Colidae	142	138	280	7.04
7.	Phasanidae	104	176	280	7.04
8.	Jacanidae	106	114	220	5.53
9.	Ciconiidae	46	34	80	2.01
10.	Upupidae	44	36	80	2.01
11.	Alcedinitae	42	36	78	1.96
12.	Rallidae	14	18	32	0.80
13.	Corvidae	22	06	28	0.74
	Total	1,872	2,106	3,978	100

t = 1.65, df=13, P=0.12 Source: Field Survey (2011 – 2013)

Table 2 and 3 revealed the average number of both terrestrial and aquatic bird's species encountered during the morning and evening survey. Most of the nine (9) birds species were available in the evening with Motocilla flava being the highest occurred species (28.01%), followed by Ploceus

nigeirimus (23.91%) and the lowest was Apus affinis (1.34%) and Tackus erthrorhynchus (1.25%) respectively. However, there was no significant difference between morning and evening observations among birds' species encountered (Table 2). Out of the six birds' species sampled at the aquatic area of the park. Ardeola ibis had the highest with (52.76%), followed by Actophilormis africana (32.83%), while the lowest was Ceryle rudis (1.96).In this case, there was a significant difference between the morning and evening observations (Table 3). More so, the result of average number of birds species across the seasons among the families presented in figures 3, revealed that the family ploceidae was the highest for both seasons and the lowest was corvidae family. However, more birds were found during the dry season.

Table. 2: Average terrestrial birds encountered (Savanna woodland/Riparian) Morning + Evening at the park.

S/n	Scientific name	Common name	Morning	Evening	Frequency	Percentage (%)
1.	*Motocilla flava*	Yellow Wagtail	296	332	628	28.01
2	*Ploceus nigeirimus*	Vieillot's black Weaver bird	240	296	536	23.91
3	*Francolinus Squamatus*	Scaly Franolin	142	166	308	13.74
4.	*Corvus albus*	West African Thrush	142	138	280	12.49
5.	*Nectarinia cuprea*	Collard birds	102	104	206	9.19
6.	*Ploceus cucullatus*	Village Weaver bird	56	90	146	6.51
7.	*Prinia Subflava*	Laughing Dove	44	36	80	3.57
8.	*Apus affinis*	Little African Swift	04	26	30	1.34
9.	*Tackus erthrorhynchus*	Red beaked hornbill	22	06	28	1.25
	Total	West African Thrush	1,048	1,194	2,242	100

t=0.33,df=8,p=0-25. Source: Field survey(2011-2013)

Table. 3: Average aquatic (Lake) birds encountered Morning + Evening at the park.

S/n	Scientific name	Common name	Morning	Evening	Frequency	Percentage (%)
1.	*Ardeola ibis*	Cattle egret	384	532	916	52.76
2.	*Actophilormis Africana*	Lily trotter	206	364	570	32.83
3.	*Ciconia episcopis*	White necked Stork	46	34	80	4.61
4.	*Riparia palridicola*	African sand martin	42	36	78	4.50
5.	*Ceyx picta*	Pigruy King fisher	40	18	58	3.34
6.	*Ceryle rudis*	Pied King fisher	18	16	34	1.96
	Total		736	1,000	1736	100

t = 0.33, df = 51, P = 0.75 Source: Field Survey (2011 – 2013).

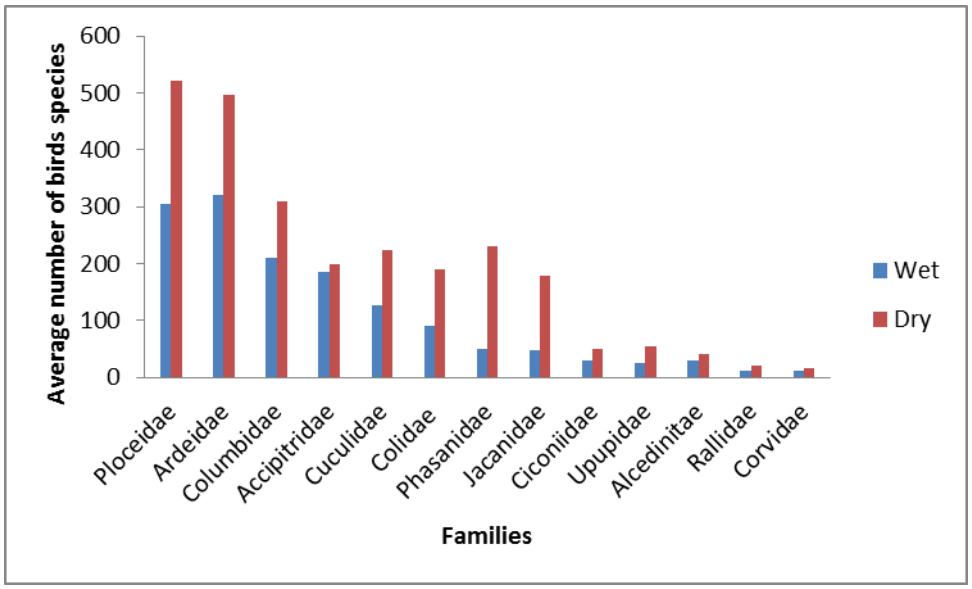

Fig. 3: Average number of birds by families encountered in the Park (wet and dry).

4. Discussions

A total of fifteen birds' species belonging to 13 families were encountered in two major ecological zones of the Pandam wildlife Park. The species composition was however very low compare to the research of Audu and Shola, (2016) who surveyed the birds' species abundance and diversity in and around the surrounding farmland of the park. This is not surprise as the major vegetation of the park that would have encouraged the activities of birds ranging from breeding, feeding etc is affected over the years through logging, fuel wood collection and burning activities (Uloko and Yager 2017; Yager et al., 2018).

Birds are quite mobile and they respond quickly to the ecological needs. Most birds are widespread and abundant due to their ability to exploit landscape transformed by humans, making it possible for them to expand their home ranges (Ratcliffe and Crow, 2001). The difference in species abundance between two ecological zone revealed that the terrestrial area had nine birds species at varied composition at morning and evening survey. More so, Motocilla flava was the highest occurred species (28.01%), followed by Ploceus nigeirimus (23.91%) and the lowest was Apus affinis (1.34%) and Tackus erthrorhynchus (1.25%) respectively. However, there was no significant difference between morning and evening observations. Perhaps, this could be as the result of closeness of each ecological zone. Six birds' species were sampled at the swampy/aquatic area, Ardeola ibis was the dominant species with (52.76%), followed by Actophilormis africana (32.83%), while the lowest was Ceryle rudis (1.96%). They were seen feeding on the fish species like tilapia, clarias and carp in the lake, hence, this account for their regular presence in the swampy/aquatic zones of the Park. This agreed with the submission of Zedler, (2003) in his report that some birds foraged for food in the wetland soils, some found food in the water column and yet some fed on the vertebrates and invertebrates that lives on submerged and emergent plants. However, there was a significant difference between the morning and evening observations at the strata.

The savanna woodland/riparian strata had the dominant birds' species composition of 2,242 against 1,736 for swampy/ aquatic area. The higher number of terrestrial birds in the Park could be attributed to the greater resources such as food, nesting sites and more space to support more resident birds. This again agreed with the view of Peterson and Westmark, (2013) who observed that some birds' species richness and diversity within wetlands can positively be correlated with the percentage trees cover.

Also, the main factor determining bird species diversity and abundance are vertical heterogeneity and tree density Gove et al., (2008). Birds were however, more in the dry season of the survey, perhaps during the raining season more feed are available even at the nearby farmland, giving them more distribution alternative, therefore they were more diverse in the dry season of the park since the area is protected.

5. Conclusion

Avifauna communities are often referred to as an ideal indicator to monitor the ecological condition of any protected area as they impact on all the trophic levels of a terrestrial and aquatic ecosystem. Pandam Wildlife Park consists of terrestrial (Guinea wooded Savannah grassland), riparian forest (forest around the lake) and wetland area (Pandam lake) including other river tributaries empting into the lake. These are quite important for the bird communities. The park attracted many local birds' species to roost, forage and nest. However, there was no significant difference in the number of terrestrial and aquatic birds observed during the study. The birds observed were mainly local resident species. However, Pandam Wildlife Park can have more birds' species if human activities such as encroachment, logging and fuel wood collections are not threatening the life of avifauna.

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