



Distributional Pattern of Avifauna Species in Different Habitat Types in Ardo-kola and Yorro Local Government Areas, Taraba State, Nigeria

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ABSTRACT

The study seeks to determine and compare avifauna distribution in Ardo-kola and Yorro local Government area of Taraba State. The habitats were divided into Open Habitat, Montane Forest and Plantation Habitat. Point count method was used to collect data on avifauna distribution. 11,772 avifauna species from 37 families and 65 species were recorded. High avifauna distribution was observed both in wet and dry seasons in Plantation habitat. Plantation habitat can serve as a refuge for avifauna species, hence, there is needs for conservation attention by the local authorities and Locals

INTRODUCTION

The distribution pattern of the birds depends on the territory sorts of scavenging and perching grounds. Some birds used the same habitat types for feeding and roosting while the others are not. The nourishment accessibility of nourishment sorts and sum moreover depends on the regular variety. Bird's species distributions along the landscape are not uniform (Bibby, Burgess and Hills, 1992). The distribution of numerous bird species are determined by the composition of the vegetation that shapes a major component of their habitats (Aynalem and Bekele., 2008). Plantations can give living space for a significant number of local bird species which this changes with the scene setting. Plantations built up in a woodland lattice create less affect on bird communities than those in a steppe network Maria et al. (2008) .Their patterns are strongly related to environmental factors (climatic condition, topography and habitats) and human interventions which determine bird species distribution (Rodriquez-Estrella, 2007; Jankowski, 2009). As a result, different studies somewhere else within the world endeavored to ponder components that influence bird distribution spatial and transient scales (Mengesha et al., 2011). The seasonal variations in the amount of rainfall and temperature and spatial and temporal microhabitat condition are known to affect the availability of various nourishment items for birds (Mengesha et al., 2011). Based on species affectability to sort of territory, these can modify the dissemination of birds in an area. Birds select habitats that fit their requirements for successful reproduction and survival though some generalist species may utilize several habitats (Rodríguez-Estrella, 2007). For instance Mountain plover (*Charadrius mountainus*) feeds mainly on pests (flies, beetles, crickets, grasshoppers, ants); uses ground for nesting and fancy short grass whereas Mongolian sand plover (*Charadrius atrifrons*) bolsters on spineless creatures (molluscs, worms, crustaceans especially crabs and insects), uses tree for nesting and prefer shore of the lakes. Hence habitats, either earthly or sea-going confine bird species distribution and differences (MacLean, 1970).

The study of Distribution pattern of bird species becomes important not only for knowledge but also for conservation purposes as birds has been used as ecological indicators environmental ponders on birds are imperative to decide the biodiversity within the area and to understand the territory prerequisites of the species and populace dynamics (16). In Taraba, especially with the study areas there is limited amount of researches carried out on the avifauna diversity, abundance and distribution in different ecosystem.

This paper focuses on the Distributional pattern of avifauna Species in Diverse Habitation Varieties in Ardo-kola and Yorro local Government Areas of Taraba State, Nigeria.

METHODS

Description of the Study Areas

The study was carried out in Ardo-kola and Yorro Local Government Area of Taraba State, Nigeria (Figures 1).

Ardo-kola Local Government is situated between latitude 9000'N and 9030'N and longitude 11000'E and 12000'E. The Local government lies to the west of Jalingo main town it about 10 minutes drive to Sunkani, Ardo-Kola local government administrative headquarters. Yorro Local Government Area is located between latitude 8042'N to 9012'N and longitude 110 20'E to 110 45'E. Yorro LGA.

Rainfall

Taraba State lies entirely North of the equator and within the tropics. The rainy season coincides with the Northern hemisphere summer. The mean annual rainfall here is between 900mm 1600mm isohyets. Rainy season last for about 6-7 months. Rainfall varies widely from place to place to year except in a few mountainous localities. The year has been divided into two seasons: wet and dry seasons. The total annual rainfall season from South to the North (Elgood, 1994).

Vegetation

There is hardly any vegetation that has not been affected by human activities in the state. Farming, logging, hunting, urbanization, road construction and other development activities as well as the rapid expanding population have together reduced the state natural plant cover to isolated remnants. Based on the edaphic and climatic conditions, the following vegetation zones are recognized in Taraba State Southern: Guinea Zone, Northern Guinea Zone, Montane Forest, and Montane Grassland (Federal Ministry of Environment, (FMEN) 2001).

Socio-Economic Activities

Hunting is the traditional occupation of the people while farming is the most important economic activity. Cattle rearing and petty trading are also carried out in the area. Important crops produced in the area include yam, maize, groundnut, guinea corn, bambara nut, millet, tiger nut and cassava (Ahmed et al., 2011).

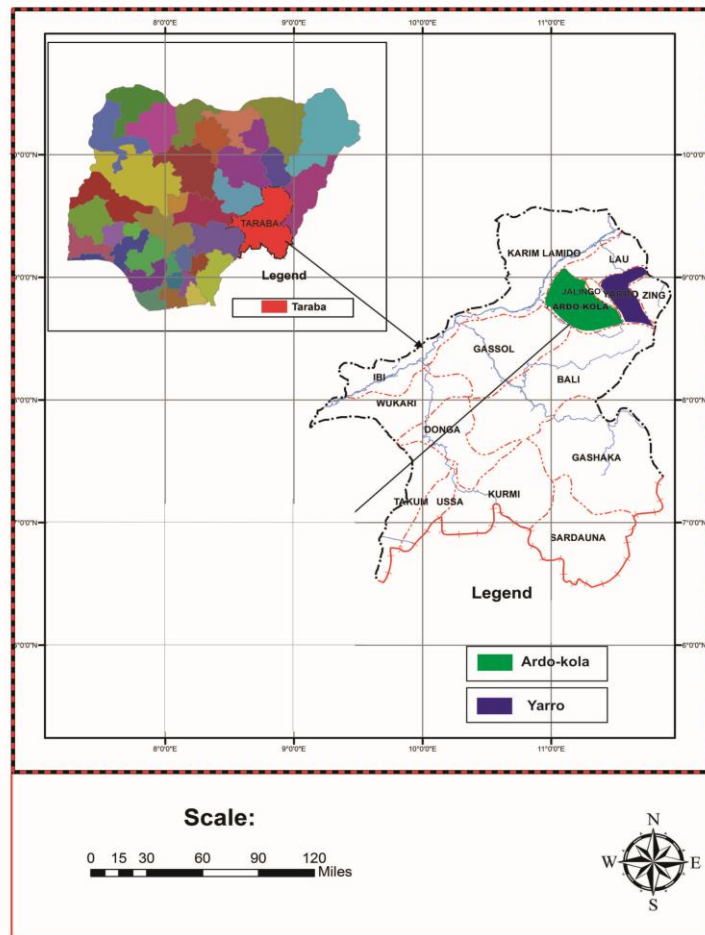


Figure 1. Map of Nigeria Showing Taraba State

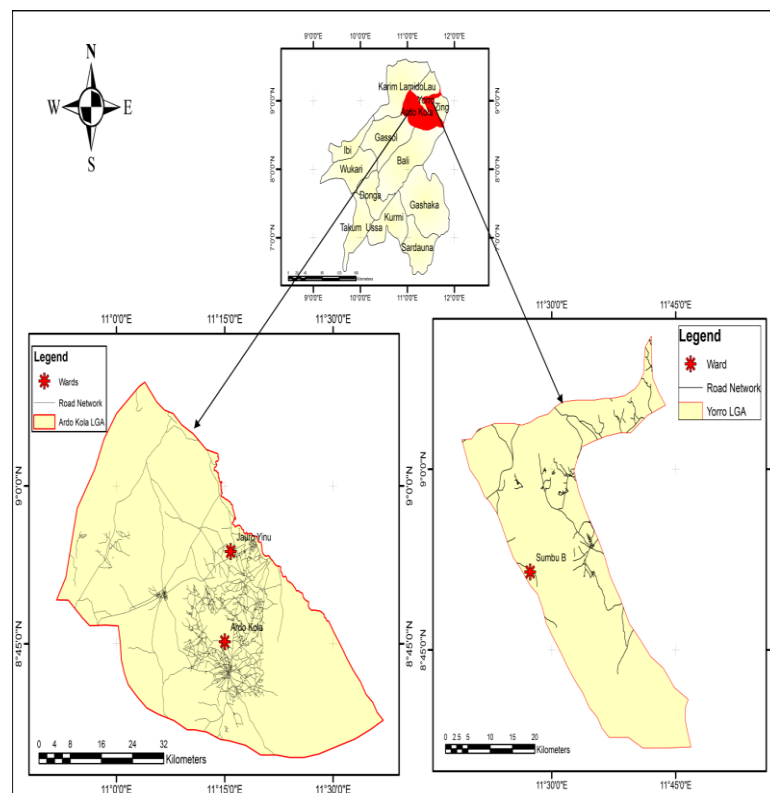


Figure 2. Map of Taraba State showing Study Area

Study Design and Data Collection Techniques

The study was conducted in Ardo-kola and Yorro Local Government Area of Taraba. Data were collected during the wet season and dry season (September 2018-February 2019) for 15 days every month. The area was stratified into Montane forest, Plantation habitat and Open habitat. Montane forest was defined as an area with density of trees and mountains ; plantation habitat as an area of covered with economic trees and farm lands; open habitat was defined as vegetation characterized by height of two (2) meters but not exceeding eight (8) meters. The coordinate of each habitat were taken using hand held GPS (eTrex 20X GARMIN).

Systematic sampling method was applied to select thirty (30) permanent counting points with a distance of 100 m apart; avifauna were also counted outside 25m radius and were included (Bibby et al. (1992). The point count method was the most suitable for such uneven terrain (steepness), and dense undergrowth in which detection of avifauna using other techniques may be difficult. The researcher chose a 25m radius to compare avifauna distribution, and abundance among the different habitat types.

Point Count Method was used for bird census at the study area. Hence, counting station was established systematically and land marks such as stones, posts or trees were marked with conspicuous water resistant paint. The number of counting stations was 30 point for each habitat. However, stations were spaced to ensure that they were not overlapping in the counting of avifauna species. The spacing distance was 100 m to avoid counting of individual avifauna species for more than one counting station, which could spuriously inflate the sample size and influence the result. This is because if the space is too small, other species would be overlooked and if it's too long there will be overlapping.

Point Count Method as outlined by Bibby et al. (1992), Ralph et al. (1993) and Sutherland (1997) were used for the census of birds on each study site. Proper data sheet was used for recording of data. Binocular, field guides of Birds of west Africa by Borrow and Demey(2004) and Wrist watch was used for the censuses. Birds census was taken from 6:30am to 8:30am during the day; this is because birds are more active and can be easily seen during the early hour of the day. On arrival at a counting station, the observer waited for 3 minutes before counting began (Bryan et al., 1984). This was done to allow the birds to settle down following expected disturbance by the arrival of the observer. The observer positioned himself at the counting station and recorded all the birds identified by sight or calls within a fixed distance of 25m and beyond the distance separately. Each avifauna species was reckoned merely once.

Data Analysis

Avifauna species distribution was analysed using ANOVA used as the Statistical Package for Social Science (SPSS) to test if there is significant differences of avifauna distribution in the three (3) habitat types and excel Microsoft word was use to arrange data the distribution.

RESULTS

11,772 avifauna species from 37 families and 65 species were distributed within the different habitats namely; Open habitats, Montane forest and Plantation habitat. According to Table 1, Plantation habitat (17) recorded the highest number of species, followed by Open habitat (14) and the least was Montane forest (6). Ten (10) species were sighted in both Open habitat and Montane forest; three (3) species each in Plantation habitat and Montane forest and Open habitat and Plantation while twelve (12) species of avifauna occurred in all the three (3) habitat types.

The result, the t-test analysis gave a large value of t-statistic, which indicates positive difference among the variables. Also, the p-value of 0.003 implies that the mean difference in the number of birds in Montane forest, Open habitat and Plantation habitat is statistically significant at 99% significant level. With this result, the null hypothesis that “there is no significant among the number of birds in the three habitats” is rejected. In conclusion the difference in the number of birds in the three (3) habitats is statistically significant (Table 1).

Table 1: Distribution of avifauna species in the different habitat types

Habitats	No. Families	No. of species	No. of birds
Montane forest	PIAH	6	3,517
Open habitat	PIAH	14	3,986
Plantation habitat	PIAH	17	4,269
Montane forest and Open habitat	PIAH	10	
Montane forest and Plantation habitat	PIAH	3	
Open habitat and Plantation habitat	PIAH	3	
All the three Habitats	PIAH	12	
Total	37	65	11,772

Key: PIAH= Present In All Habitat

Table 2: Significant Difference in Distribution of Avifauna Species in the Different Habitat Types

Number of	t.value	df	sig.	Mean difference
Habitat				
3	17.894	2	0.003	3924.00000

DISCUSSION

Avifauna Distribution

Plantation habitat recorded the highest number of species in both seasons than the two other habitats (open habitat and montane forest). This could be related to availability of food, nesting/breeding site, shelter, hideout/ protection site from predators and water around the habitat as observed in the field which is in line with the findings of Maria et al. (2008) who concluded that Plantations habitat can give living space for a considerable number of local bird species, which this shifts with the scene setting. The least number of species recorded in the Montane forest which was not unrelated to deforestation, clearing of land for farming and bush burning which could have deprived avifauna species a resting/preening site, or escape from predators. Variation in avifauna distribution pattern suggests they might be habitat-specific or habitat generalist and it follows the spatial structure of the environment and habitat requirement of the avifauna species. During the course of this study it was observed that some avifauna were seen in a specific habitat in both dry and wet season, for example Fork-tailed drongo *Dicrurus adsimilis*, Yellow-billed shrike *Corvinella corvina*, Senegal parrot *Poiphalus senegalus*, Winding cisticola *Cisticola galactotes*, Little green bee-eater *Merops orientalis*, Didric cuckoo *Chrysococcyx caprius* and Bruce's green pigeon *Treron wa'alia*; they were recorded only in the Open habitat, the same trend was observed in the Plantation habitat where the Red bishop *Euplectes franscanus*, Village weaver *Ploceus cucullatus*, Pied kingfisher *Ceryle rudis*, Spur winged plover *Veneillus spinosus* and Common bulbul *Pycnonotus barbatus* were observed. Rock pigeon *Columba livia*, African hill babbler *Pseudoalcippe abyssinica*, White-tailed hornbill *Tockus fasciatus*, Reichenow's fire finch *Lagonosticta (rhodopareira) umbrinodorsalis*, Broad-tailed warbler *Schoenicola platyura* and Western mountain greenbul *Andropadus tephrolaemus* were recorded in the Montane forest. This could probably be due to their attraction to habitat-specific environment/ terrain which is influenced by either evolution or environmental modification in the Open habitat; it could also be due to their tolerance ability to adapt to environmental condition inherent across these habitats. This finding concurs with Sekercioglu et al. (2006) who reported that, birds encountered in various

habitat types indicate their tolerance to a wide range of ecological conditions. On the other hand avifauna species like Purple glossy starling *Lamprotornis purpureus*, West African thrush *Turdus pelios*, Senegal coucal *Centropus senegalensis* Black-billed wood dove *Turtur abyssinicus*, Ring necked dove *Streptopelia capicola*, Piapiac *Ptilostomus afer*, Cattle egret *Bubulcus ibis*, Little sparrow hawk *Accipiter minullus*, Laughing dove *Streptopelia senegalensis* and Common kestrel *Falco tinunculus* were observed in all the three (3) studied habitats. This spatial pattern of avifauna species distribution and habitat specific and generalization could be due to availability of food, preference nesting/breeding site and seasonal variation. This is in agreements with Girma et al. (2017) who reported that bird species habitat preference is a function of preferred food availability, suitable cover and the extent of disturbance in a particular habitat type. Indeed in spite of the fact that, the characteristic woodland is less favored by most bird species due its normal homogeneity that give as it were small array of food types, species that are forest specialists are mostly confined to the forested habitat types.

CONCLUSION

Avifauna species distribution was higher in area with human activities i.e plantation habitat The higher distribution suggests higher ecological stability compared to areas with less human disturbed habitats where few species occur.

More conservation efforts should be put in place to improve upon bird diversity in human occupied environment, and creation of garden and Fruit tree planting should be encouraged. This will enhance bird species distribution around human settlement and farmland.

The study also provides evidence that though human prompted ruckus habitat may cause high distribution, yet Open habitat and Montane forest are important part of the biological that houses large numbers.

The study also concluded that any activities that changes the habitat structure does not alter avifauna distribution.

RECOMMENDATIONS

The study recommends that further research should be conducted to ascertain what really is responsible for high distribution in plantation habitat and lesser distribution in the open habitat and Montane Forest.

Because the communities are oblivious of the fact that birds are important part of ecosystem as environmental health indicator, pollinators and pest controller, the local government authorities and traditional ruler to organize a sensitization campaign to enlighten the locals.

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