

ORIGINAL RESEARCH

**Avifauna and Trees Diversity in Relation to Habitat Type at Metallurgical Training Centre,
Ajaokuta Kogi State**

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ABSTRACT

Avifauna and tree communities are key indicators of ecological integrity for habitat quality, climate resilience and biodiversity richness, yet baseline data for Ajaokuta, Kogi State (Guinea Savanna zone) remain scarce. This study assessed the diversity and abundance of trees and birds across three habitat types: savanna, forest, and riparian within the MTC Ajaokuta landscape, and identified anthropogenic pressures shaping their distribution. Tree assemblages were sampled using the Modified Whittaker technique, while bird populations were surveyed via point counts during twice-weekly visits over six months. Ancillary observations recorded human activities affecting the habitats such as hunting, deforestation and bush burning. Data were processed in Microsoft Excel and SPSS 23 version. Results revealed 18 tree species (282 individuals) in the savanna, 24 species (135 individuals) in the forest, and 25 species (137 individuals) in the riparian zone. Shannon-Weiner indices were 0.31 (low) for savanna, 1.88 (moderate) for forest, and 1.87 (moderate) for riparian habitats. Bird surveys recorded 17 species (432 individuals) in savanna, 17 species (416 individuals) in forest, and 35 species (825 individuals) in riparian habitat, with Shannon indices of 1.57, 1.58, and 1.58 respectively indicating moderate diversity across all habitats but highest richness in riparian areas. Ongoing anthropogenic activities, including hunting, deforestation, bush burning, and urban encroachment, were pervasive and pose significant threats to biodiversity. The findings underscore the need for stringent conservation measures, sustainable land-use practices, protected-area designation, and continued monitoring to safeguard the avian and arboreal communities of MTC Ajaokuta.

Keywords: Avifauna, Habitat, MTC, Anthropogenic, Trees

Introduction

A habitat in ecology is where a species lives. It is the natural environment of such a species (Shuaibu et al., 2018). The presence of trees in an environment plays an important role in the environment as it purifies the air, during the process of photosynthesis, trees take in carbondioxide and produce the oxygen we breath, nourishes the soil, and also provides human life with shelter, wood, and food. Trees play significant roles in life. Without trees on the earth, birds can hardly live. It should be noted,

however, that both birds and trees contribute to each other naturally for mutual survival. This is because whereas trees provide shelter for birds, birds feed on trees and help to dispersed the seeds of the trees on which they feed. Trees with hollows in their trunk or branches provide shelters and nesting spaces for birds species (Okeke et al., 2021).

Birds form a very important group of organisms inhabiting almost everywhere on earth and serving as indicators of the health and conditions of an environment. Birds serve as seed disperser, pollinators, scavengers and sanitary agents. They also serve as good biological control and indicate environmental hazards (Kumar et al., 2015). Therefore, an environment that is healthy will witness an abundant presence of birds species as well as other organisms (Adang et al., 2015). Metallurgical Training Centre (MTC) can safely be called cradles of diversity and abundance of trees and birds species. It plays an important role in the climate of its region which provides abundant habitat for a variety of trees and birds species, as it occupies 34 hectares of land, amidst emerald green woodland with a suitable humid temperature conducive for rearing trees and for birds' habitation (Source; MTC, Ajaokuta Prospectus and Information Handbook, 2021).

Many terrestrial habitat has been converted include construction of roads, railways, industrialization, rural and urban development, settlement, deforestation, erosion, bush burning, indiscriminate hunting and killing of animals and debarking of trees which has caused destruction to both trees and birds (Nigeria biodiversity and tropical forestry assessment, maximizing agricultural revenue and key enterprise in targeted site, 2017). Due to deforestation in Nigeria, many trees and bird species are exposed to hot weather and this also causes birds to be exposed to their predators (Integrity Research Journals, 2022; AgriSci Group, 2023). Logging threatens the survival of trees and birds, which limits the ability to provide food sources for habitat species.

Diversity is the variety of species richness and relative abundance of different entities of each species in a sample (Millennium Ecosystem Assessment, 2018). Knowledge of patterns of biodiversity over time allows for only very approximate estimates of background rate of extinction, or of how fast species have become extinct over geological time (Ceballo et al., 2015; Diaz et al., 2019).

Trees and birds have been observed to play a very significant role like ecosystem balance through air purification and seed dispersals in our natural environment, both in rural and urban areas in Nigeria and in other developing countries. Kogi is a state with various natural habitats: savanna, forests, riparian, mountains, wetlands, ponds, streams, rivers, all situated at the confluence of River Niger and

River Benue (Yaro et al., 2021). Despite all the efforts at conservation, human activities have caused damages to the natural resources which have resulted in extinction of some indigenous trees and bird species. Shuaibu et al. (2014) revealed that efforts at large-scale forest plantation establishment, which was done on yearly basis, did not yield the desired result. However, biological species, such as trees and birds, are constantly being deteriorated as a result of rapid hunting, deforestation, debarking of trees, bush burning and other anthropogenic activities taking place in Nigeria, and these activities are observed here in Ajaokuata, Kogi State.

Metallurgical Training Centre (MTC), Ajaokuta area, is characterized by species of trees and birds for conservation, educational, and economic importance. Similarly, many natural habitats such as forest, savanna (grassland), riparian forest, and mountain in MTC, Ajaokuta are seen as waste land and as a result are often neglected in terms of research. However, they may serve either as sources or sinks to threatened species (Tanko, 2012). These aspects of source-sink importance have not been investigated at MTC, Ajaokuta. This study seeks to provide information on the diversity and abundance of trees and birds in the area, which will contribute to existing literature on the trees and bird species in Kogi State. The results obtained from the study will provide baseline information on the tree and avifauna diversity and abundance of the area, which should serve as a guide for designing conservation and management strategies of the study area. Therefore the objectives of the study were to determine the trees diversity, and abundance of each of the habitat types in Metallurgical Training Centre Ajaokuta area, checklist the avifauna diversity, and abundance of each of the habitat types in Metallurgical Training Centre Ajaokuta area, and the anthropogenic activities that may affect the abundance and distribution of trees and avifauna of the area.

Materials and Methods

Study Area

The study area covered the vicinities of the Metallurgical Training Centre (MTC), Ajaokuta Steel Company, up to the bank of a stream situated along Ajaokuta native town which is situated along main Administrative block of the Metallurgical Training Centre (MTC). The Metallurgical Training Centre (MTC) is located along the western flank of the Niger Bridge Estate Road, linking the Okene-Itobe dual carriageway at the bridgehead. The average annual rainfall in the area varies between 1000 and 1500 mm.

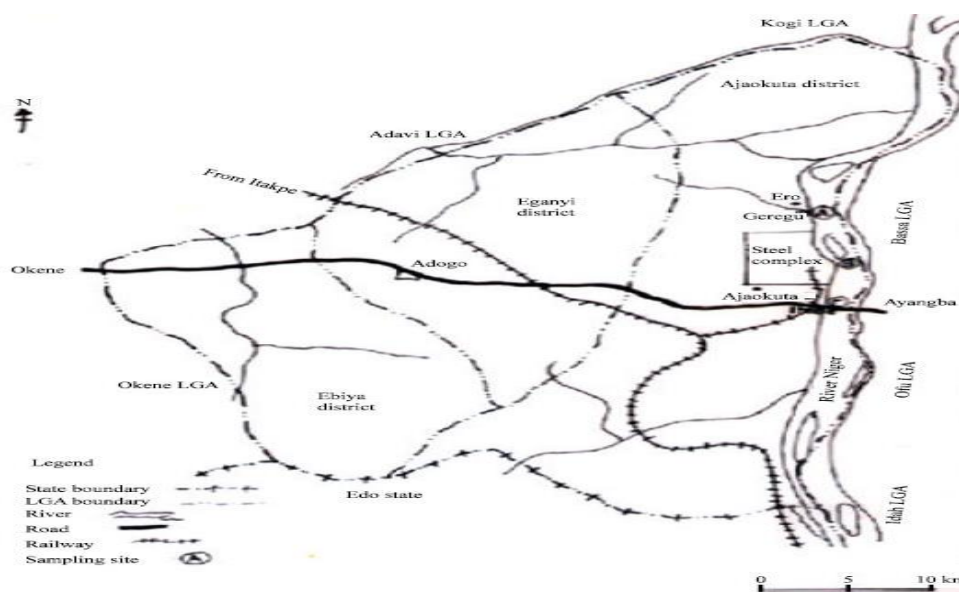


Figure 1: Map of study area

Source: (Modifies Map of Ajaokuta MTC 2021)

Study Design

The study was carried out in six months. A six-month period during the rainy season, from May to October 2023. Three habitat types were selected and labelled as follows: S1 representing open savanna woodland (grassland) opposite the main administrative block, S2 representing the forested area, which is the main MTC compound, and S3 representing the riparian habitat along a stream leading to Ajaokuta native town.

The field was visited twice a week in each of the periods that make up the range of the six months during rainy season. Modified Whittaker's technique was used. A 100m x 100 m plot was laid in each of the habitat types, and these were further splited into five (5) sub-plots of 20m x 20 m. The spacing and variation of the plot length was determined by the shape and size of the vegetation types, and it was mapped out using surveyor tapes, pegs and twine (Plumper *et. al.*, 2015). Sampling of trees was conducted. Individual tress species in each of the subplots were identified and counted.

Sampling of Trees

Modified Whittaker's Technique described by Tanko (2012) was used. In each of the selected habitat types, a line transect of 100m was laid (Nautiyal, 2015). Five sub-plots of 20 m x 20 m were laid down across 100 m x 100 m on each of the 3 habitat types of the study area. The trees species in each

habitat types were identified, listed, counted, and recorded using field guide of trees as described by (Cottam *et al.*, 1956, Martinez and Lopez *et al.*, 2023).

Avifaunal Sampling Procedure

The sampling of birds was conducted by using point count method (Nautiyal *et al.*, 2015 and Bibby *et al.*, 2000). In point count method, birds seen or heard in estimated 25m radius from a randomly chosen point were recorded by the appearance or call Raphe *et al.* (1993). Birds sighted or heard were identified and counted. The sampling of birds was done at the early hours of the morning and evenings when birds are active. Field notebook was used to record the date of data collection, local names of species, family, locality of collection, habit and habitat, scientific names, vegetation and collector's name.

Field visits was done twice a week with each site visited at least twice in a month for the period range of six month during rainy seasons. Birds encountered during the visits were observed and identified with the aid of field guide of birds of Western Africa by Borrow and Demey (2013). A pair of binoculars was used for sighting distant birds and those birds that were not visible were identified by listening to their sounds and compared to the recorded bird's songs with a bird calls application before recorded. The sampling of bird species was done between 7:00 -10:00 am and 4:00 – 6:30pm when most of the birds were active.

Determination of Anthropogenic Activities that May Affect the Abundance and Distribution of Trees and Avifauna of the Area

The anthropogenic activities such as saw-millers, fuelwood collection, debarking of trees, bush burning, deforestation, grazing, construction of road, railway, industrialization, habitat modification, and habitat fragmentation were observed, and representative photographs of these activities were taken.

Data Analysis

Shannon diversity index (H) was used to calculate diversity of trees in the six month in the three habitat types. Other species diversity indices such as species richness, evenness, Pielou index of equitability (used to calculate how the species individuals are distributed) and Margalef `s index (to compare species richness) and similarity index were also computed. Microsoft excels 21version and SPSS software were instruments used for statistical analysis.

Shannon Weiner's Diversity index =

$$H = - \sum (p_i \ln p_i),$$

Where: H = Maximinm diversity Pi= Proportion of total sample represented by species $\Sigma =$

The evenness

Pielou's Evenness Index (J') =

$$J' = \frac{H'}{\ln(S)}$$

Where: H' = Shannon Weiner's Diversity index S = The number of species $\Sigma =$ The evenness

Relative abundance was calculated as percentages from estimated number of individuals.

$$\text{Abundance} = \frac{n}{N} \times 100$$

Where n = Total number of individuals of the species

N = Total Number of Quadrant

Relative abundance = Total number of species x 100 / Total number of individual of all species recorded.

RESULTS

Trees species composition and abundance of Habitat Types of MTC

The study showed that the Savanna habitat had eighteen (18) trees species (Figure 2), belonging to ten (10) families and a total of two hundred and eighty two (282) individuals. The family Moraceae had the highest number of species of five (5) followed by the family Fabaceae with three (3) species, Leguminosae and Laminaceae had two species each while six (6) families had one (1) species each as shown in (Figure 3).

In the forest habitat, the composition of trees species in the study area was twenty-four (24) (Figure 2), belonging to thirteen (13) families and a total of one hundred and thirty-five (135) individual were encountered. The families Mimosaceae and Moraceae had the highest numbers of four (4) species each followed by the family Meliaceae with three (3) species. Combretaceae and Rubiaceae had two (2) species each while eight (8) families had one species each (Figure 3).

In the Riparian habitat, twenty-five (25) tree species were recorded (Figure 2), belonging to twenty (20) families and a total of one hundred and thirty-seven (137) individual encountered. Five (5)

families had the highest number of species (Musaceae, Moraceae, Anacardiaceae, Meliaceae and Fabaceae), while fifteen (15) families had one (1) species each (Figure 3).

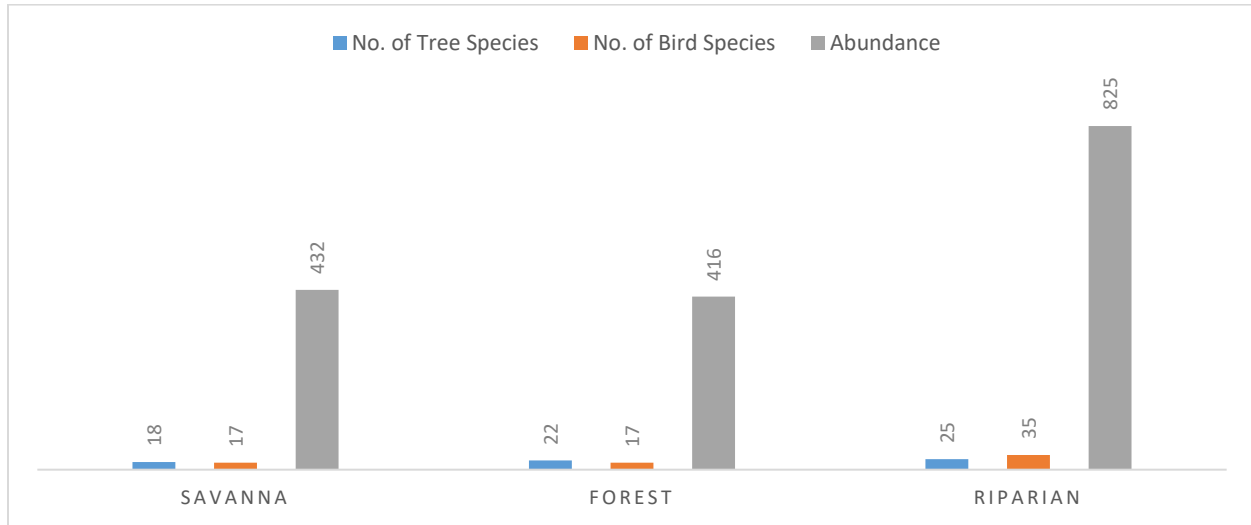


Figure 2: Species Diversity and Abundance Composition of Trees and Birds at MTC, Ajaokuta, Kogi State

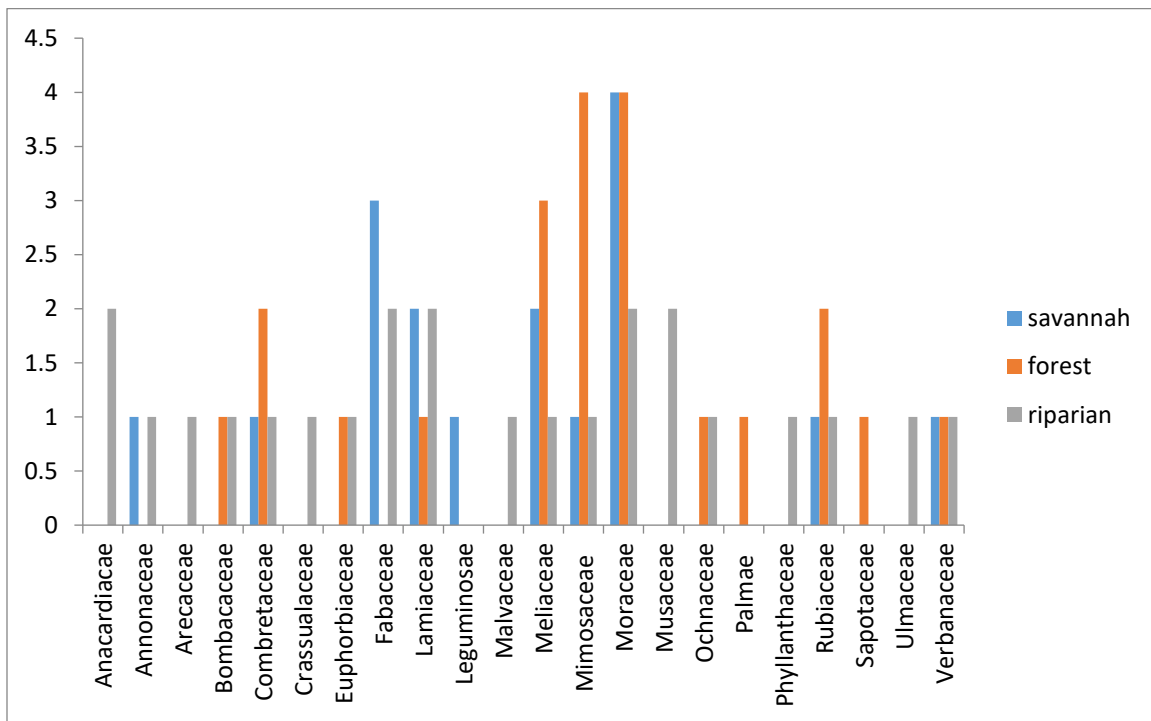


Figure 3: Relative Composition of Trees Family across Habitat Types in MTC, Ajaokuta, Kogi State

Bird Species Composition and Abundance of each Habitat Type of MTC

In Savanna habitat seventeen (17) birds species (Figure 2) belonging to eleven (11) families and a total four hundred and thirty-two (432) individual were encountered (Figure 2), the families of five (5) had the highest number, *Ploceidae*, *Numididae*, *Columbidae*, *Accipitridae*, and *Cisticolidae* while six (6) families had one (1) specie each as showed in Figure 4. The forest habitat had seventeen (17) species (Figure 2) belonging to thirteen (13) families and a total of four hundred and sixteen (416) individual encountered. The families *Columbidae* had highest of three (3) followed by *Cisticolidae* and *Muscophagidae* families with two (2) each while ten (10) families had one (1) species each showed in (Figure 4). The Riparian habitat bird species had the highest of thirty-five (35) bird species (Figure 2) belonging to nineteen (19) families and a total number of eight hundred and twenty-five (825) individual were encountered. The family of *Columbidae* had the highest six (6), followed by *Muscicapidae* four (4), *Bucerotidae* and *Cisticolidae* three (3), three (3) families had two (2) each while twelve (12) families had one (1) each (Figure 4).

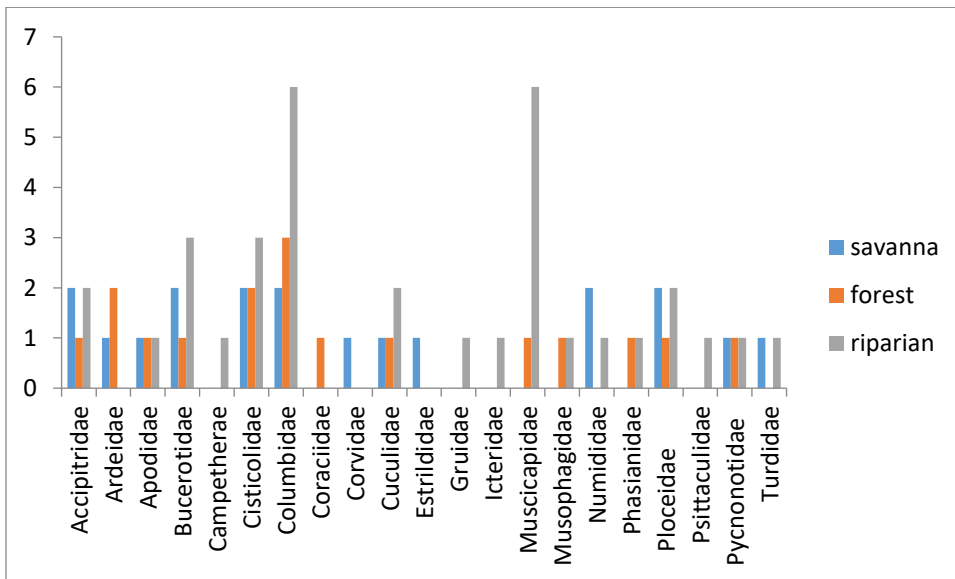


Figure 4: Relative Composition of Birds Family across Habitat Types in MTC, Ajaokuta, Kogi State

Anthropogenic Activities of Metallurgical Training Centre

Plate I-III shows all the anthropogenic activities observed at each of habitat types throughout the study months. Mostly bush burning were carried out during dry season in order to cut down trees for charcoal, firewood.



Plate I: Anthropogenic activities carried out by lumbers



Plate II: Charcoal burning activities at MTC



Plate III: Felling of trees/Logging of wood

Discussion

The differences in tree and bird species diversity across habitats reflect the influence of vegetation structure and resource heterogeneity on species distribution. The encountered rate of the trees in Savanna habitat, Forest habitat and Riparian habitat is in agreement with the findings of Hengeveld et al., 2015, who stated that species diversity is an important attribute of a natural community that influences the functioning of an ecosystem. The higher the trees diversity of the Savanna, Forest, Riparian habitat the more efficient the ecosystem functioning. This study of habitat type also revealed

the eurytopic species and goes to support the work of Thomas (2016), in which they reported that savanna, forest and riparian habitat species are endangered. Also Shuaibu (2014) in his work carried out on forest habitat types in Idah L G A, recommended an intensive work to be able to identify such endangered species.

The study, in simulation to the abundance of avifauna and trees across habitat types showed that the riparian forest had the highest number of tree species, hence highest number of birds species, than forest and savannah habitats. This might be due to altitude effect, affecting trees species composition, abundance and diversity (Dangles et al., 2017). The work revealed that in Northern altitude Guinea Savanna habitat species, there tend to be a decline in vegetation and elevation, creating microclimate that in turn determines temperate highest, low vegetation with dry soil characteristic. Therefore, trees in this area have low biodiversity. Forest habitat species tends to be increased with vegetation that creates lower climate that in turn determine temperate vegetation with trees growing rapidly. While in southern altitude, riparian habitat species tends have highest rate, with soil moisture associated with green vegetation, highest biodiversity that creates cool climate, and tree growths are highest with change in soil moisture characteristics. Riparian zones promote many different trees communities with increases of trees diversity and birds settlement. According to Dar et al. (2021), these changes in altitude in Guinea Savanna affects the distribution and diversity of trees species directly or indirectly through limiting availability of various needs and energy that flows into the ecosystem.

This research work also revealed the different anthropogenic activities mostly occurring, saw millers, farming, deforestation affects on the diversity and abundance of trees (Plate I–III). Thomas et al. (2015) in their study of savanna, forest and riparian habitat discovered that anthropogenic activities such as lumbering, farming etc have been negatively affecting the natural habitat of tree and bird species, influencing their variety and variability. Human activities such as civilization causes habitat fragmentation and habitat modification. This study indeed revealed such anthropogenic activities taking place in Metallurgical Training Centre Ajaokuta. Meanwhile Rocio et al. (2015), in their studies noted that human activities can lead to decrease in tree and bird habitats.

The study equally revealed rich composition of bird species in each habitat types. The encountered rate of birds in savanna, forest and riparian habitat is in agreement with findings of Adang et al. (2018) who stated that an environment that is healthy will witness a very rich abundance of bird species as well as other organisms. However, the relative abundance indicates there are more species of birds to be sighted in the area.

The study showed anthropogenic activities especially the sawmilling, charcoal burner, fuelwood and farming activities. The findings of Thomas et al. (2015); Temidojo et al. (2021); Samuel et al. (2022), who stated that agricultural encroachment and habitat modification by clearance affect birds diversity and this study indeed revealed such anthropogenic activities taking place in the study area.

Conclusion

In view of the results of this study, there are observed rich composition, abundance, and moderate diversity of tree and bird species across the savanna, forest, and riparian habitat types of the Metallurgical Training Centre, Ajaokuta. And these observations suggest that maintaining habitat heterogeneity within the MTC landscape is essential for sustaining avian and floral diversity. Integrated management practices that conserve savanna, forest, and riparian habitats are therefore crucial. The study highlights the need for further research to continuously assess species diversity in relation to both birds and trees and the impacts of anthropogenic activities within the study area. Conservation measures should be initiated, and the findings of this study should serve as baseline data for government-led biodiversity management programs. Anthropogenic activities such as sawmilling, charcoal production, fuelwood collection, and farming should be monitored and regulated to prevent severe negative impacts on tree and bird populations. The Metallurgical Training Centre, Ajaokuta, has the potential to serve as an important biodiversity hotspot and should be recognized as a critical component of regional conservation strategies.

Consequently, the Metallurgical Training Centre communities should see riparian source species as agents of reduction of flood risk to both urban and rural communities, promotes the sustainable management of forest resource including timber, non-timber, forest products and medicinal trees.

Author's contribution

Dauda, A.: Conceptualization, methodology, data curation, analysis, original draft preparation, review and editing. Tanko, D.: Data curation, final review Adang, K. L.: Data curation. Olakunle, D. E.: Data curation, final review, final editing

Conflict of interest

The authors declare that they have no competing interests.

Acknowledgements

God Almighty and my supervisors from the Department of Biology: Conservation Biology option, Federal University Lokoja.

Funding

Dauda Abibetu

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APPENDIX

Table 1: Checklists of Tree species diversity and abundance in Across Habitat Types of Metallurgical Training Centre (MTC) Ajaokuta

Savanna		Forest		Riparian	
Botanical name	Common name	Botanical name	Common name	Botanical name	Common name
<i>Azadirachta indica</i>	Neem	<i>Ficus polita</i>	Fig	<i>Gmelina aborea</i>	Beech wood
<i>Anogeissusleocarpus</i>	Axlewood tree	<i>Ficus umbellate</i>	Fig	<i>Azadirachta indica</i>	Neem
<i>Ficus exasperate</i>	Sandpaper tree	<i>Khaya senegalensis</i>	Savanna mahogany	<i>Eleiasguinensis</i>	Palm tree
<i>Albizia lebbeck</i>	Lady's tongue	<i>Khaya ivorensis</i>	Lagos mahogany	<i>Musa paradisiaca</i>	Banana, Plantain
<i>Piliostigmathonningii</i>	Strangler fig	<i>Anogeissusleocarpus</i>	Lagos mahogany	<i>Nauclea latifolia</i>	African peach
<i>Nauclea latifolia</i>	African peach	<i>Acacia Sp.</i>	Thorn tree wattle	<i>Phyllantusmulerianus</i>	Tips wood
<i>Daniella oliveri</i>	African balsam	<i>Vitellaria paradoxa</i>	Shear butter tree	<i>Brideliaferruginea</i>	Kirmi kinri
<i>Gmelina aborea</i>	Gmelina	<i>Annona senegalensis</i>	African custard apple	<i>Vitex doniana</i>	Black plum
<i>Ficus sycomorus</i>	Sycamore fig	<i>Newboldialeavis</i>	Tree of life, fertility	<i>Acacia ataxacantha</i>	Flame thorn
<i>Khaya senegalensis</i>	Savanna mahogany	<i>Nauclea latifolia</i>	African peach	<i>Bryophylum pinnatum</i>	Miracle leaf
<i>Annona senegalensis</i>	Annona	<i>Azelia Africana</i>	African mahogany	<i>Adansonia digitata</i>	Baobab tree
<i>Vitex doniana</i>	Black plum	<i>Parkia biglobosa</i>	Locust bean	<i>Ficus thonningi</i>	Strangler fig
<i>Azeliaafricana</i>	African mahogany	<i>Prosopis Africana</i>	Misquite	<i>Trema orientalis</i>	Charcoal tree
<i>Parkia biglobosa</i>	Locust bean	<i>Phyllantusmulerianus</i>	Tipsy wood	<i>Borrasuseathiopum</i>	Fan palm
<i>Tectona grandis</i>	Teak	<i>Acacia kamerunensis</i>	Black wattle	<i>Mangifera indica</i>	Mango
<i>Treculiaafricana</i>	African breadfruit	<i>Ceiba pentandra</i>	Silk cotton tree	<i>Acacia sycomorus</i>	Sycamore fig
<i>Albizia zygia</i>	Mepepe	<i>Borassus eathiopum</i>	Fan palm	<i>Daniella oliveri</i>	African balsam
<i>Cassia bicarpsularis</i>	Butterfly bush	<i>Ficus capensis</i>	Broom cluster fig	<i>Parkia biglobosa</i>	Locust bean
		<i>Lophira alata</i>	Ekki	<i>Musa sapientum</i>	Jamaica banana
		<i>Vitex doniana</i>	Black plum	<i>Vitex simplicifolia</i>	Black plum
		<i>Ficus thonningi</i>	Strangler fig	<i>Annona muricata</i>	Soursop
		<i>Albizia lebbeck</i>	Lady's tongue	<i>Anacardium occidantale</i>	Cashew
		<i>Vitex simplicifolia</i>	Black plum	<i>Khaya ivorensis</i>	Lagos Mahogany
				<i>Ceiba pentandra</i>	Silk cotton tree
				<i>Terminalia superba</i>	Limba wood

Shannon Weiner Diversity Index= 0.309, 1.88 , 1.87 respectively

Table 2: Checklists of Bird species diversity and abundance in Across Habitat Types of Metallurgical Training Centre (MTC) Ajaokuta

Savanna		Forest		Riparian	
Scientific name	Common name	Scientific name	Common name	Scientific name	Common name
<i>Ploceus cucullantus</i>	Village weavers	<i>Ploceus cucullantus</i>	Yellow weavers	<i>Ploceus cucullantus</i>	Village weavers
<i>Fillagonostictalagonosticta</i>	Red billed bird	<i>Milvus aegyptius</i>	Yellow billed kites	<i>Pogoniulusstti sulphureus</i>	Yellow fronted Tinker
<i>Numida meleagris</i>	Guinea fowl	<i>Spilopelia senegalensis</i>	Laughing Dove	<i>Campethera punctuligera</i>	Fine spotted bird
<i>Priniasubflava</i>	Tawny flanks	<i>prinia subflava</i>	Tawny flank bird	<i>Pycnonotus barbetus</i>	Common Bulbul
<i>Numida meleagris</i>	Turatauracopersa	<i>Bupycnonotus barbatus</i>	Common bulbul	<i>Fraseriacinerascens</i>	Northern-black flycat
<i>Turdus pelios</i>	African thrush	<i>Camaroptera udata</i>	Grey backed bird	<i>Pogoniulusatroflavus</i>	Yellow-rumped birds
<i>Kaupifalogrammicus</i>	Lizard buzzard Hawk	<i>Scopus umbretta</i>	Hamerkop	<i>Stiphorniserythrothorax</i>	Orange breasted forest
<i>Streptopelia semitorquata</i>	Red eyed dove	<i>Coracias cyanogaster</i>	Blue bellied Roller	<i>Camaroptera brevicaudata</i>	Grey-backed optera
<i>Euplectes franciscanus</i>	Northern Reuplectes	<i>Streptopelia vinacea</i>	Vinaceous Dove	<i>Milvus aegyptius</i>	Yellow billed kites
<i>Ptilostomus afer</i>	Crows bird	<i>Crinifer piscator</i>	Western plantain eater	<i>Streptopelia turtur</i>	Turtle Dove
<i>Cuculus solitaries</i>	Red cheated bird	<i>Melaenornisedolioides</i>	Northern-Black her	<i>Pternisticbicalcaratus</i>	Double-spurred in
<i>Pogoniulusatroflavus</i>	Yellowrumped Tinker	<i>Pternisticbicalcaratus</i>	Doublespurred in	<i>Sheppardiapolioptera</i>	Gray-winged-Robin
<i>Turdur afar</i>	Blue spotted Dove	<i>Centropus senegalensis</i>	Senegal coucal bird	<i>Kaupifalcomonogrammicus</i>	Lizard buzzard
<i>Scopus umbretta</i>	Hamerkop	<i>Turturafer</i>	Turtle Dove	<i>Cypsiurus parvus</i>	African-palm-stool
<i>Bupycnonotus barbatus</i>	Common bulbul	<i>Cypsiurus parvus</i>	African palm swift	<i>Crossyphaheuglin</i>	African Robin
<i>Camaroptera brevicaudata</i>	Greybacked optera	<i>Lophoceros nasutus</i>	African grey hornbill	<i>Prinia subflava</i>	Tawny flanked prinia

<i>Milvus aegyptius</i>	Yellow billed kites	<i>Scopus umbretta</i>	Hamerkop	<i>Streptopelia semitorquata</i>	Red eyed Dove
				<i>Camaroptera brevicaudata</i>	Grey backed bird
				<i>Dolichonyx Oryzivorus</i>	Bronze montLonchura
				<i>Centropus senegalensis</i>	Senegal coucentropus
				<i>Streptopelia senegalensis</i>	Laughing Dove
				<i>Crinifer piscator</i>	Western plantain eater
				<i>Streptopelia vinacea</i>	Vinaceous Dove
				<i>Balearica regulorum</i>	Helmeted Guinea fowl
				<i>Eucalyptus alobuluslabill</i>	Common eucalyptus
				<i>Euplectesfranciscanus</i>	Northern Red Bishop
				<i>Turdus pelios</i>	African thrush
				<i>Lophoceros nasutus</i>	African Grey hornbill
				<i>Tauracopersa</i>	Guinea turaco
				<i>Cuculus solitaries</i>	Red chested cuckoo
				<i>Stiphorniserythrothorax</i>	
				<i>Streptopelia decipiens</i>	
				<i>Streptopelia turtur</i>	

Shannon Weiner Diversity Index= 1.57, 1.58, 1.58 respectively