International Journal of
Life Sciences
International Peer Reviewed Open Access Refereed Journal

Int. J. of Life Sciences, 2019; 7 (4):625-630
ISSN:2320-7817(p) | 2320-964X(o)

Original Article Open Access

Vegetation along River Bank (Riparian) In Ondo State, Nigeria

Erhenhi AH

Department of Botany, Faculty of Science, Delta State University, Abraka, Nigeria
Email: erhenhiah@gmail.com; Tel: +2348066231663

Manuscript details:

Received: 30.10.2019
Accepted: 10.12.2019
Published: 30.12.2019

Cite this article as:
Erhenhi AH (2019) Vegetation along River Bank (Riparian) In Ondo State, Nigeria, *Int. J. of Life Sciences*, Volume 7(4): 625-630.

Available online on
http://www.ijlsci.in
ISSN: 2320-964X (Online)
ISSN: 2320-7817 (Print)

ABSTRACT

This study was carried out to assess the riparian vegetation along Ofe River, Ondo State, Nigeria as well as the air and water temperature and soil analysis. Plants were collected around the river bank alongside the soil samples for chemical analysis. The plants were identified and soil samples analyzed. The study revealed the presence of sixteen (16) plant species belonging to twelve (12) families including Apocynaceae, Araceae, Asteraceae, Athyriceae, Costaceae, Fabaceae, Lauraceae, Malvaceae, Musaceae, Nymphaeaceae, Poaceae and Solanaceae. It was observed that majority of the plants were herbs with few trees and shrubs. The air temperature range between 31^0C and 35^0C while the water temperature range between 26^0C and 30^0C. Soil analysis showed the presence of metals such as nitrogen (N), phosphorus (P), potassium (K) sodium (Na), calcium (Ca) and magnesium (Mg) in varying concentrations. The results from this study revealed the presence of several species of plant as dominant in the Ofe River of Ondo State, Nigeria. The study also showed that there is lack of anthropogenic activities which has resulted in the high flora diversity of the study area.

Keywords: Riparian vegetation, Ofe river, Ondo State

INTRODUCTION

Agriculture is one of the most dominant human activities usually carried out in the riparian environment due to the level of soil fertility which support the growth of crops and allows for high yield in crops grown around such vegetation (Egbinola *et al.,* 2014). Riparian vegetation are plants that resides or grows partially or completely water and are clearly distinguished from other plant communities. These vegetations and its environment have been highly encroached by man's activities and subsequently affected the nature of vegetation, soil, land and wide life (Ellis and Pontius, 2007). Consequences of man's activities on these riparian vegetations included the effects on floristic composition and species diversity at a particular place and landmass (Alvarez-Yepiz *et al.,*

2008). Activities such as indiscriminate and unwholesome tree falling, uncontrolled bush burning, use of pesticides for agriculture as well as massive industrialization has been the main reasons for tampering destruction of the riparian vegetation.

Numerous environmental benefits have been and will continue to be enjoyed from the riparian vegetation. These benefits include their use as bio-filters of natural importance, protection of aquatic environment from excess sedimentation as well as runoffs from polluted surfaces and erosion. These environments also are rich in food materials and provide shelter and shade for wide range of aquatic organisms necessary for regulation of temperature. Wildlife and aesthetic functions are also important functions of the riparian vegetations. They harbor numerous plants which serve as host and shelter to both aquatic and terrestrial animals. They are important in the reduction of the impact of climate change in the environment (Emuh and Gbadegesin, 2009). The economic and social values of these important and natural vegetations cannot be over-emphasized. Species such as *Pentadesma butyracea* in the Beninese riparian forest and *Vitellaria paradoxa* are important and valuable riparian vegetation of economic and social values (Natta, 2003). These vegetations filter nutrients and sediments which are deposited in water bodies (Natalie, 2008). The riparian buffers are also important in water uptake, storage and runoff control (Tabacchi, 2000).

Similar to other forest environment, the riparian vegetation and zones are also prone to degradation caused by human and anthropogenic activities. However, these riparian zones have been observed to have more resilient efficacy compared to other vegetations as a result of the productive nature, species diversity and abundance (Naiman *et al.,* 2005). Although, several disturbing factors such as logging, flood regime and deforestation has impacted changes on the riparian vegetation (Damasceno *et al.,* 2005; Goetz *et al.,* 2006). The need to meet the demand of the teaming population as well as make agricultural and food products available via farming form consumption has also resulted in the alteration and modification of the riparian vegetation globally (Aduradola, 2004; Aguiar and Ferreira, 2006). Also, the indiscriminate use of resources of both plant and animal species has resulted in the reduction of riparian species resulting to outright extinction (Allan *et al.,* 2002; Emuh and Gbadegesin, 2009). This study therefore seeks to examine the vegetation along river bank (riparian) in Ofe River, Ondo State, Nigeria, with a view to documenting the floristic composition and vegetation as well as the species diversity of the plant community.

MATERIALS AND METHODS

Description of study area

The study was carried out in Ofe River, Ondo State, Nigeria. The study area lies within the basement complex area of Ondo State in the Southwest of Nigeria and lies within latitudes 6° 00' and 8° 45' North and longitudes 5° 30' and 6° East. In the area the proliferation of many river channels characterize the drainage system. The vegetation is dense and made up of broad-leaved trees that are mostly evergreen (Mogaji *et al.,* 2011).

Collection of riparian vegetation

Trips were made to the different sites of Ofe River, Ondo State chosen for the sampling. Plants around the sampling sites were collected by cutting parts of the leaves and stem with cutlass and place on clean polyethylene bags. Soil samples were also obtained from the sampling sites and transferred to the Chemistry Laboratory, Delta State University, Abraka for soil analysis.

Identification and Classification of Plants

The plants collected were identified locally by the collector and the indigenes who aided in collection at the field, providing the local names and some common names of the plants. Scientific identification and classification of the collected specimens to species level as well as into different life form/habits was done using textbook. Those which were not identified in the field were preserved in polyethylene bags and transferred to the Department of Botany, Delta State University, Abraka where they were eventually identified by an Ecologists.

Soil analysis, Air and Water Analysis

Surface soil samples were collected and stored in clean plastic bottles in a cold container until analysis was carried out. The analysis was carried out using the Association of official Analytical Chemist (AOAC, 1985) Official Methods of soil Analysis. The air and water temperature were taken by using mercury in glass thermometer. The thermometer was allowed to read

properly both inside the water and around the water body to obtain a stable result which was recorded.

RESULTS

The study of the riparian vegetation of Ofe River revealed the presence of sixteen (16) plant species belonging to twelve (12) families including Apocynaceae, Araceae, Asteraceae, Athyriceae, Costaceae, Fabaceae, Lauraceae, Malvaceae, Musaceae, Nymphaeaceae, Poaceae and Solanaceae. Table 1 shows the families, common names and life forms of the plants encountered. It was observed that majority of the plants were herbs with few trees and shrubs.

Table 1. Plants species encountered and their families

S/N	Plant species	Family	Common names	Life Form
1	*Cinnamomum zeylanuicum* J.	Lauraceae	Ceylon cinnamon tree	Tree
2	*Costus afer* Ker	Costaceae	Spiral ginger	Herb
3	*Sida acuta* L.	Malvaceae	Wireweed	Shrub
4	*Baissea axillaris Benth*	Apocynaceae	Liana	Shrub
5	*Piltandra virginica*	Araceae	Green arrow	Herb
6	*Corchorus olitorius*	Malvaceae	Jews mallow	Shrub
7	*Vernonia amygdalyna* Belile	Asteraceae	Bitterleaf	Shrub
8	*Victoria amazonica* J.C	Nymphaeaceae	Victoria rega	Herb
9	*Solanum tuberosum* L.	Solanaceae	Potato	Herb
10	*Bambusa vulgaris* L.	Poaceae	Bamboo	Herb
11	*Mimosa pudica*	Fabaceae	Sensitive plant	Herb
12	*Athyrium thelypteroides* Desv.	Athyriceae	Spleenwort	Shrub
13	*Pennisetum purpureum* Schu.	Poaceae	Elephant grass	Herb
14	*Musa acuminate* Colla	Musaceae	Banana	Herb
15	Phoenix dactylifera	Araceae	Date palm	Tree
16	*Raphia hookeri* G.Mann	Araceae	Raphia palm	Tree

Table 2. Air and water temperature of the studied sites

Sites	Air Temperature (^{0}C)	Water Temperature (^{0}C)
Site I	31^{0}C	27^{0}C
Site II	35^{0}C	30^{0}C
Site III	32^{0}C	28^{0}C
Site IV	34^{0}C	26^{0}C
Site V	34^{0}C	28^{0}C

Table 3. Soil analysis of the study area

Sites	N	P	K	Na	Ca	Mg
Site I	0.280	0.214	2.940	0.170	3.004	0.845
Site II	0.181	0.276	3.140	0.284	3.007	0.914
Site III	0.373	0.381	2.776	0.384	3.841	0.903
Site IV	0.118	0.314	2.009	0.379	3.009	0.890
Site V	1.603	0.284	2.943	0.416	2.984	1.840

Nitrogen (N), Phosphorus (P), Potassium (K) Sodium (Na), Calcium (Ca) and Magnesium (Mg)

The study also reported the air and water temperature of the area and recorded temperature across the five sites studied. The air temperature range between 31^0C and 35^0C while the water temperature range between 26^0C and 30^0C. The highest air temperature was recorded in Site II with 35^0C while the least was recorded in Site I with 31^0C. Also the highest water temperature was recorded in Site II with 30^0C while the least was recorded in Site IV with 26^0C (Table 2).

Table 3 shows the soil analysis of the sample ssites across the five station studied. The analysis showed the presence of metals such as nitrogen (N), phosphorus (P), potassium (K) sodium (Na), calcium (Ca) and magnesium (Mg) in varying concentrations.

DISCUSSION

The study of the riparian vegetation of Ofe River revealed the presence of sixteen (16) plant species belonging to twelve (12) families including Apocynaceae, Araceae, Asteraceae, Athyriceae, Costaceae, Fabaceae, Lauraceae, Malvaceae, Musaceae, Nymphaeaceae, Poaceae and Solanaceae. The high number of families and vascular plants species found at both regional and local scale confirmed that riparian areas had a high floristic biodiversity. This result, according to many other authors (Naiman *et al.,* 2005), underlined the importance of riparian landscapes for biodiversity conservation, particularly in Mediterranean areas (Corbacho *et al.,* 2003).

Some general features of riparian flora resulted to be similar in both regions: i) the dominant families, *Poaceae*, *Asteraceae* and *Fabaceae,* are the dominant families of in Italian flora in general (Podda *et al.,* 2011); ii) the most frequent species, linked to human impacted habitats, showing that probably riparian areas with the higher similarity, since the alterations of the internal structure of Mediterranean riparian corridors determine the proliferation of terrestrial opportunistic or nitrophylous species (Ferreira and Aguiar, 2006). Also the simplification of the structural heterogeneity (Corbacho *et al.,* 2003); iii) the presence of hygrophylous trees, found mainly downstream (Landi and Angiolini, 2007), with species (azonal) shared in general among all rivers (see Naiman *et al.,* 2005); iv) the trend of life forms, with negative correlations between herbaceous (perennials and annuals) and woody plants, a pattern already observed by Lite *et al.* (2005) in riparian habitats of semi-arid zones.

Our results, however, indicated a high floristic heterogeneity, probably due in part to the variation in environmental features that have different importance within different regions, but also to historical-biogeographical factors such as: i) different geological origin and paleographic history of the area, that consequently affected the available species pools of each area (Whittaker *et al.,* 2001), determined by evolutionary and historical processes and proved to be important for understanding community composition; ii) the insularity of the area, due to its prolonged Tertiary isolation, together with high geological diversity and wide range of habitats, that contributed to the differentiation of neo-endemics that are specific to each area. At the same time, we found different distribution patterns of taxonomic groups, life forms and chorological groups at regional level. The major differences about families can be related to different land use management with species typical of shrubby formations, as a consequence of the abandonment of traditional management and subsequent expansion of woody vegetation (Rocchini *et al.,* 2006).

CONCLUSION

The results from this study revealed the presence of several species of plant as dominant in the Ofe River of Ondo State, Nigeria. The study also showed that there is lack of anthropogenic activities which has resulted in the high flora diversity of the study area.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

REFERENCES

Aduradola AM (2004) Impact of farming activities on vegetation in Olokemeji forest reserve, Nigeria. *Global Nest*, 6(2):131-140.

Aguiar FC and Ferreira MT (2006) Riparian and aquatic vegetation in Mediterranean-type streams (western Iberia). *Limnetica*, 25(1)411-424.

Allan JD, Brenner AJ, Erazo J, Fernandez L, Flecker AS, Karwan DL, Segnini S and Taphorn DC (2002) Land use in watersheds of the Venezuelan Andes: A comparative analysis. *Conservation Biology* 16(2): 527-538.

Alvarez-Yepiz JC, Martinez-Yrizar A, Burquez A and Lindquist C (2008) Variation in vegetation structure and soil properties related to land use history of old-growth and secondary tropical dry forests in northwestern Mexico. *Forest Ecology and Management*, 256(3): 355-366.

Association of official Analytical Chemist (AOAC) (1985). Official Methods of Analysis 12th (ed).

Blasi C, Marignani M, Copiz R, Fipaldini M, Bonacquisti S, Del Vico E, Rosati L, Zavattero L (2011) Important Plant Areas in Italy: From data to mapping. *Biological Conservation,* 144(1): 220-226.

Bulgarini F, Petrella S and Teofili C (2006) Biodiversity Vision dell'Ecoregione Mediterraneo Centrale. WWF Italia-MIUR, Roma.

Corbacho C, Sanchez JM and Costillo E (2003) Patterns of structural complexity and human disturbance of riparian vegetation in agricultural landscapes of a Mediterranean area. *Agricolture, Ecosystem and Environment,* 95:495–507.

Damasceno G, Semir J, Dos Santos FM and Leitao-Filho HDF (2005) Structure, distribution of species and inundation in a riparian forest of Rio Paraguai, Pantanal, Brazil. *Flora* 200:119-135.

Egbinola CN and Amanambu CA (2013) Climate Variation Assessment Based on Rainfall and Temperature in Ibadan, South-Western, Nigeria. *Journal of Environment and Earth Science*, 3(11):32-45.

Egbinola CN, Amobichukwu CA and Modebayo EY (2014) Impact of Farming on Riparian Vegetation Along Ona and Orogun Rivers, Ibadan, Oyo State, Nigeria. *Geografia (Londrina)* 23(1):127 – 150.

Ellis E and Pontius R (2007) Land-use and land-cover change. In: Encyclopedia of Earth. Eds. Pontius R., Cleveland C.J.

Emuh CN and Gbadegesin AS (2009) Species diversity patterns along the forest savanna boundary in Nigeria. *Management of Environmental Quality* 20(1)64-72.

Flannigan MD, Logan KA, Amiro BD, Skinner WR and Stocks BJ (2009) Future area burned in Canada. *Climatic Change*, 72(1-2):1-16.

Gentili R, Armiraglio S, Rossi G, Sgorbati S and Baroni C (2010) Floristic patterns, ecological gradients and biodiversità in the composite channels (Central Alps, Italy). *Flora* 205: 388-398.

Goetz D, Horsch, B and Porembski S (2006) Dynamics of forest-savanna mosaics in north-eastern Ivory Coast from 1954 to 2002. *Journal of Biogeography* 33:653-664.

Hillebrand H (2005) Regressions of local on regional diversity do not reflect the importance of local interactions or saturation of local diversity. *Oikos* 110:195–198.

Hortal J, Rodrìguez J, Nieto-Diaz M and Lobo JM (2008) Regional and environmental effects on the species richness of mammal assemblages. *Journal of Biogeography* 25: 1202-1214.

Lalanne A, Bardat J, Lalanne-Amara F and Ponge JF (2010) Local and regional trends in the ground vegetation of beech forests. *Flora* 205: 484-498.

Lite SJ, Bagstad KJ and Stromberg JC (2005) Riparian plant species richness along lateral and longitudinal gradients of water stress and flood disturbance, San Pedro River, Arizona. *Journal of Arid Environments* 63:785–813.

Mittelbach GG, Steiner CF, Scheiner SM, Gross KL, Reynolds HL, Waide RB, Dodson SI and Gough L (2001) What is the observed relationship between species richness and productivity? *Ecology* 82:2381–2396.

Mogaji KA, Olayanju GM and Oladapo MI (2011) Geophysical evaluation of rock type impact on aquifer characterization in the basement complex areas of Ondo State, Southwestern Nigeria: Geo-electric assessment and Geographic Information Systems (GIS) approach. *International Journal of Water Resources and Environmental Engineering* 3(4): 77-86.

Naiman RJ and Decamps H (2007) The ecology of interfaces-riparian zones. *Annual Review of Ecology and Systematic* **28**:621-658.

Naiman RJ, Decamps H and McClain ME (2005) *Riparia: Ecology, Conservation and Man agement of Streamside Communities.* Elsevier: Amsterdam.

Natalie CP (2008) The Role of Ibu odo Sacred Pools in Preserving Riparian Forest Structure and Diversity along the Oueme and Okpara Rivers of Central Benin. *Tropical Resources Bulletin* 51:51-59.

Natta AK (2003) *Ecological Assessment of Riparian Forests in Benin: Phytodiversity, Phytoscoiology and special distribution of tree species.* Ph.D. Thesis. Wageningen University, the Netherlands.

Rey B and Schneier SM (2002) Plant diversity, biogeography and environment in Iberia: patterns and possible causal factors. *Journal of Vegetation Science* 13: 245-258.

Rivas-Martinez S (2007) Mapa de series, geoseries y geopermaseries de vegetación de España. *Itinera Geobotanica*, 17: 5-436.

Rosenzweig ML (2005) Species diversity in space and time. Cambridge University Press, Cambridge, UK.

Sieben EJJ, Mucina L and Boucher C (2009) Scaling hierarchy of factors controlling riparian vegetation patterns of the Fynbos Biome at the Western Cape, South Africa. *Journal of Vegetation Science* 20(1):17-26.

Tabacchi E, Lambs L, Guilloy H, Planty-Tabacci A, Muller E and Descamps H (2000) Impacts of riparian vegetation on hydrological processes. *Hydrological Processes* 14:2459-2976.

van Coller AL, Rogers KH and Heritage GL (2000) Riparian vegetation – environmental relationships: complementarity of gradients versus patch hierarchy approaches. *Journal of Vegetation Science* 11:337-350.