Bima Journal of Science and Technology, Vol. 3(1) July, 2019. ISSN: 2536-6041

DIVERSITY AND RELATIVE ABUNDANCE OF FISH SPECIES IN GOMBE ABBA RIVER, GOMBE STATE, NIGERIA

HASSAN, S.K.; ISAH, Z. AND SANI, A.A.

Department of Biological Sciences, Gombe State University, Gombe.
Corresponding author: suybakimaan@gmail.com

ABSTRACT

The Diversity and Relative Abundance of Fish Species in Gombe Abba River was conducted between April and June, 2018. Fish samples were collected bi-weekly at the selected landing sites from the local fishermen as soon as they returned from their catch. The fish samples were stored in sampling bucket and were transported to the laboratory, Biological Sciences Department, Gombe State University for identification, using Field Guide to Nigerian fresh water fishes (Babatunde and Raji, 2004). The study revealed eight (8) species representing eight (8) families with the following percentages, *Mormyrus rume*, 23.16% as the most abundant fish fauna in the river, followed by *Oreochromis niloticus*, 21.05%; *Barlius niloticus*, 18.42%; *Clarias lazera*, 11.05%; *Alestes leuciscus*, 9.21%; *Schilbe mystus*, 7.90%; *Nannocharax spp*, 5.26% and *Marcusenius spp* having the least abundant of the total fish species identified (3.95%). The result revealed few species composition compared to other rivers. This may be due to fishing pressure, differences in physico-chemical parameters, seasonal preferential and some of the species are carnivores (e.g. *Marcusenius spp*). Therefore, a detailed and longer research should be undertaken on this river to elucidate the fish species diversity and abundance.

Keyword: Diversity, relative abundance, fish species, Gombe Abba, river

INTRODUCTION

Nigeria is blessed with abundant natural water bodies with abundant fish resources. In many developing Countries like Nigeria, fish accounts for a high proportion of animal protein intake of the population (Lima *et.al*, 2006). Fish provide at least 40% of dietary animal protein of people living in the developing world. Fish also supply highly digestible protein and is a rich source of minerals, fatty acids and water-soluble vitamins, (Lima *et.al*, 2006). The high value of nutrition in fish is particularly important for lower income groups that might otherwise depend on a cereal-based food to meet their dietary needs. The protein is first class, inexpensive and its composition and consumption is desirable (Moses, 1990). Riverine ecosystems have suffered from intrinsic human intervention such as sewage, runoff from farmland, cities, and factory effluents, industrial waste and the build-up of sediment resulting in habitat loss and degradation and as a consequence, many fish species have become highly endangered, particularly in rivers where heavy demand is placed on fresh waters. Nigerian freshwater bodies are the richest in West Africa in terms

of fish abudance (Meye and Ikomi, 2008). The fish resource apart from being a major source of high-quality animal protein for man, provide several socio-economic values as resources of job opportunities and raw material for some industrial activities as well as recreational purposes (Yakub, 2012).

Today the fish diversity and associated habitats management is becoming a great challenge (Meye Ikomi, 2008). Conversation measures to mitigate the impact of pressures have largely been slow and inadequate and as a result of the species are declining rapidly (Williams, 2012). In Nigeria, fish resources are on the decline due to over exploitation and inadequate management of coastal as well as riverine water bodies (Lawson and Olusanya, 2010).

Gombe Abba river is a source of drinking water and irrigation to Gombe Abba village, a lot of fishing activities are carried out in the river, there are no information on the diversity and relative abundance of species from the river, hence, the need for this research. The objectives were to identify various fish species and to determine the most abundant fish species in the river. The result of this study will provide baseline information on the river.

MTERIALS AND METHODS

Study area

Gombe Abba River is located in Dukku Local Government Area of Gombe state in the North Eastern part of Nigeria. The River is about 100 kilometers to the East of Gombe town with latitude 100° 17' 17N and longitude 110° 25' 52''E. It forms part of the tributary of River Gongola (Maigari *et.al,* 2006).

Sample collection

Fish samples were collected twice a week for the period of three months from May-July at the selected landing sites from the local fishermen as soon as they returned from their catch. The fish samples were stored in sampling bucket and were transported to Biological Sciences Department Laboratory, Gombe State University for identification.

Sample identification

The fish samples were identified in the laboratory up to the species levels with the aid of field guide to Nigerian fresh water fishes (Babatunde and Raji, 2004).

RESULTS

The study reveals eight (8) species representing eight (8) families, as shown in (Table 1).

Table 1: Fish Species Identified In Gombe Abba River

Family	Species identified
Bagridae	*Barlius niloticus*
Characidae	*Alestes leuciscus*
Cichlidae	*Oreochromis niloticus*
Citharinadae	*Citharinus citharus*
Claridae	*Clarias lazera*
Mochokidae	*Marcusenius spp*
Mormyridae	*Mormyrus rume*
Schilbedae	*Schilbe mystus*

Table two (2) shows the percentage composition of fish species identified in the river. The percentages are *Mormyrus rume* 23.16% and is the most abundant fish fauna in the river, followed by *Oreochromis niloticus* 21.05%, *Barlius niloticus* 18.42% *Clarias lazera* 11.05%, *Aleutes leuciscus 9.21%*, *Schilbe mystus* with 7.90%, *Nannocharax spp*, 5.26%, *Marcusenius spp* 3.95%, and having the least abundance of the total fish species identified. Whereas, the monthly composition of fish species identified in Gombe Abba river as shown below in table 3.

Table 2: Percentage Composition / Abundance of Fish Species Identified in Gombe Abba River

Fish species	Number identified	Percentage (%)
Barlius niloticus	70	18.42
Alestes leuciscus	35	9.21
Oreochromis niloticus	80	21.05
Nannocharax spp	20	5.26
Clarias lazera	42	11.05
Marcusenius spp	15	3.95
Mormyrus rume	88	23.16
Schilbe mystus	30	7.90
Total	**380**	**100%**

Table 3: Monthly Fish Species Abundance Identified in Gombe Abba River

Fish species	1st Month	2nd Month	3rd Month	Total
Barlius niloticus	30	25	15	**70**
Alestes leuciscus	15	12	8	**35**
Oreochromis niloticus	35	30	15	**80**
Nannocharax spp	10	7	3	**20**
Clarias lazera	20	15	7	**42**
Marcusenius spp	10	5	0	**15**
Mormyrus rume	40	25	23	**88**
Schilbe mystus	10	15	5	**30**

DISCUSSION

The River has a total of eight (8) species and eight (8) families, this coincides with other water bodies where similar studies had been carried out; for instance, in Gubi reservoir of Bauchi State, seven (7) family were identified (Oguzie, 1982). River Delimi Jos, where seven (7) genera were identified, (Bahat, 2005). (Anthony *et.al*, 1986) recorded four (4) species in Auree reservoir near Plateau state. Few composition and abundance of fish species in Gombe Abba river can be attributed to fishing pressure,

seasonal preferential, differences in physico-chemical parameters and certain species are carnivorous (e.g *Marcusenius spp*), this goes with the work of other tropical water bodies which have been variously attributed to several factors but principally depth, water temperature (Holden and Reed, 1972) water transparency, availability of food and migratory behavior of some of the fishes (Bahat, 2005).

The dominance of the members of *Mormyus rume* having 23.16% being the most abundant fish species in the river goes to confirm that under uncontrolled conditions in most Nigerian Inland waters, *Mormyus rume* always dominate (Siddiqui and Rahel, 2007; Yakub 2012; and Moses 2009).

CONCLUSION

The result of the study shows few species composition compared to other rivers. This is probably due to fishing pressure, seasonal preferential, differences in physico-chemical parameters and some certain species are carnivores (e.g *Marcusenius spp*). There is a need for a longer research on this river to elucidate the fish stock and develop appropriate conservation and management strategies for the fishes and fisheries.

REFERENCES

Anthony, A. O., Enerience G., and Ufodike, E.B.C (1986): Studies on the fish fauna of Auree reservoir Plateau State. Nigeria Journal of Applied Fisheries and Hydrobiology, volume 1. Pp15-16.s

Babatunde, D.O and Raji, A. (2004): Field guide to Nigeria freshwater fishes. Federal College of Freshwater Fisheries Technology. New Bussa Nigeria. 104pp.

Bahat, J.W. (2005): Limnological and trace element studies in relation to primary productivity in two marine lakes. M.Sc. Thesis. University of Jos, Nigeria, 205pp.

Holden, M. and Reed, W. (1972): West African Fresh Water Fish. Pp 4-29.

Lawson, O.E. and O.M. Olusanya (2010): Fish diversity in three tributaries of River Ore,South West, Nigeria. World Journal of fish and marine science. 2 (6): 524-531

Lima, E.T., Juniour A. and Hans, J. (2006): Freshwater fishery biology. W.C Brown Company, Dubuque, IA., USA, pp131-135, 159-166.

Maigari A.U., Ekanem E.O., Garba I.H., Harami A., and Akan J.C. (2016). Health Risk Assessment for Exposure to Some Selected Heavy Metals via Drinking Water from Dadinkowa Dam and River Gombe Abba in Gombe State, Northeast Nigeria. World Journal of Analytical Chemistry. Vol.4, No. 1, pp 1-5.

Meye, J. A. and Ikomi, R. B. (2008): A study on the fish fauna of Urie Creek at Igbide Niger Delta. The Zoologist, 6:69-80.

Moses, B. S. (1990): Distribution, ecology and fisheries potential of Nigerian Wetlands, In : E. V I Apkala and D. U. O Okali (Ed) Nigerian Wet Land UNESCO/MAB Portharcourt 35-46

Oguzie, F. (1982): Aspect of feeding behavior and a chemotrypsin in the cichlid sarotherodon niloticus (Trewavas) in Gubi Reservoir Bauchi state. M.Sc. Thesis zoology department. Uni-Jos Nigeria. Pp30.

Siddiqui, A. Q. and Rahel, F.J (2007): Reproductive biology, length-weight relationship and relative condition of Tilapia leucosticte, Naivasha, Kenya J. Fish Biol., 10:251-260.

Williams N.V. (2012); The Seasonal Distribution of the Teleost, Fish Fauna in Lagos Harbour, Creek and Lagoon in Relation to Salt Tolerance. M.Sc. Thesis. University College, North Wales, Bangor. 64p

Yakub, A. S. (2012): A Survey of Fish fauna of lower Ogun Rivers at Ishasi, Ogun State, Western Nigeria. Continental J. Fisheries and Aquatic Science 6(2): 1-7.

Bima Journal of Science and Technology, Vol. 3(1) July, 2019. ISSN: 2536-6041

STABILITY OF GRAPHENE SURFACE AN APPLICATION OF CHIRAL MODEL

[1]Y.P. RYBAKOV [2]A.B. AHMED, [2]J. SAMBO AND [3]ABDULKADIR MAGAJI

[1]Department of Physics, Peoples Friendship University of Russia.
[2]Department of Physics, Faculty of Science,Gombe State University,P.M.B127, GombeNigeria.
[3]Hussaini Adamu Federal Polytechnic Kazaure Jigawa Department of Science Lab

Corresponding Author: garkuwaz@yahoo.com

ABSTRACT

A suspended sheet of pure graphene a layer of carbon atoms bonded together in a honeycomb lattice is the most two-dimensional system imaginable. Graphene sheet have for long been known to exist in disguised from graphite (stacked graphene layers) it was generally believed that an extended graphene sheet would not be stable against the effect of thermal and other fluctuations. Furthermore, it was believed that even if they were stable, it would be impossible to isolate them so that their properties could be studied systematically. Based on this the chiral model was suggested, the ideal graphene plane were determined by the kink-like solution. The corrugation of the graphene surface was described in the form of ripple and rings. Thus, our graphene plane reviles the tendency of bending.

Keywords: Graphene, Chiral Model, Ripple, Kink

INTRODUCTION

Graphene (fig.1) has attracted great interest in condensed matter physics since its discovery due to its novel electronic structures. It is fundamentally one single layer of graphite; a layer of sp2 bonded carbon atoms arranged in a honeycomb (hexagonal) lattice. As predicted by P.R.Wallace, 1947 a suspended sheet of pure graphene, a layer of carbon atoms bonded together in a honeycomb lattice is the most two-dimensional system imaginable. It was first described by P.R Wallace, before it was discovered in 2004 by K.S.Nevoselov and A.K.Geim(Novoselov, et al., 2004).

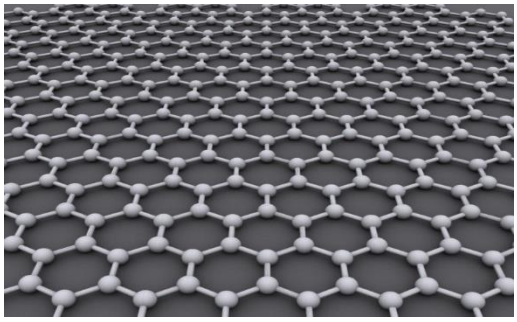

Figure 1: Graphene plane (Novoselov, 2005).

Since after the discovery that graphene could be reproducibly found on a silicon dioxide wafer, deluge of experiments immediately followed, and renewed interest has led to numerous of theoretical predictions and