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Ichthyofauna of Igbokoda River, Ondo State, Nigeria

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ABSTRACT

Fish species composition, diversity and abundant of Igbokoda River, Ondo state, Nigeria was assessed monthly for seventeen months for between June,2014 and Octber,2015.The fish

assemblage and seasonal variation were investigated. A total 1738 fishes belonging to 10 families and 42species were collected using gill net, cast nets and traps. The highest fish percentage was recorded for Clariidae (29%) followed by Cichlidae (20%) the least percentage recorded for malapteridae (1%).fish species were more abundant in the dry season than in the rainy season. This river was reported pollution free in the previous study. This is considered suitable for aquaculture practices and fish farming.

Keywords: Fish, abundance, species, composition and Igbokoda River.

1. INTRODUCTION

Nigeria is naturally blessed with vast expanses of inland waters. The total surface area of water bodies in Nigeria is estimated to be about 14,991,900 hectares (149,919km^2) and this constitutes about 15.9% of the total area of Nigeria (Ita, 1993).

Lakes and rivers around the globe are critical components of the ecological system. Natural surface waters are of importance to man for domestic uses, industrial development, navigation, boating and fishing. They provide sanctuary and food for many species of fish in addition; they have aesthetic value and provide water to a myriad of industries (Dinar *et al.*, 2005, Adebola *et al.*, 2012).

Freshwater bodies are habitats for diverse arrays of organisms ranging from plankton, nekton and other aquatic organisms. These water bodies are often used for the disposal of industrial and anthropogenic effluents on the wrong assumption that aquatic ecosystems have self-purifying ability (Fakayode, 2005, Adeogun *et al.*, 2011; Gupta, 2015). The explosion in population density, urbanization and industrialization had profound impact on human life and aquatic environment in terms of quantity and quality (Herschy, 1999). Also seasonal and climatic changes affect the quality and physico-chemistry of surface water. The increased demand for water as a consequence of population growth, agricultural and industrial development had been accompanied by research oriented towards the definition of criteria and guide for water quality (W.H.O, 1966; Muthuchelian, 2015).

Igbokoda River is used for artisanal fishing, transportation, mining of silica sand and domestic purposes. The river receives run off from chemically sprayed agricultural farms, domestic wastes, cassava peels, anthropogenic dumps at the shore; this coupled with sand mining and dredging activities could impact adversely on the biota and their environment. Despite increasing anthropogenic activities in the river, there is limited information regarding its fish fauna. This study was carried out to investigate diversity, abundance and distribution of ichthyofauna of Igbokoda River in order to provide information useful for sustainable management of the river.

Fish, the most populous and valued vertebrate in the aquatic environment, are an important source of food and recreation (Sikoki and Kolo, 1993). The inland fisheries sub-sector in Nigeria operates mainly in the remote rural areas where over 3.0 million people are engaged in artisanal fish production which contributes about 86% of the domestic fish production (Federal Department of Fisheries, 2003). Fishes are a key unit in many natural aquatic food webs and can also serve as environmental indicators of polluted water bodies (Albaret and Lae, 2003).

Fish in their habitats also suffer from several organic pollution (Mason, 1991; Oladimeji and Wade, 1994; Baden *et al*., 1990; Sikoki and Kolo, 1993; Arimoro *et al*., 2007; Ashwini A Waoo *et al*. 2015). However, abundance and species compositions and distributions of fish fauna can serve as a measure of the health–status of water body (Victor and Ogbeibu, 1985; Edokpayi and Osimen, 2001; Meena and Indra, 2015).

Fishes are the most valued living resources in aquatic environment also an important source of food and recreation. Fishes are a key unit in many natural aquatic food webs. They also can serve as environmental indicators of polluted water (APHA, AWWA, WEF, 1998). The first attempt on the checklists of fishes of the river system in Nigeria was Welman (1948) which had 181 species. This was followed by the work of White (1966) and Reed *et al*., (1967) that gave a total of 161 species in Northern Nigeria. Syndeham (1977) studies the qualitative composition and longitudinal zonation of fish fauna of River Ogun southwest Nigeria and recorded 85 species in the river. According to Olaosebikan and Raji (1998) and Idodo-Umeh (2003), Nigerian fresh waters are the richest in West Africa in term of fish species. Ita (1993) recorded 293 species during an investigation into the fish diversity of the major rivers in Nigeria. Other works on composition and distributions of fish fauna in Nigeria water bodies include Offem and Akegbejo-Samsons (2009) in Cross River, Ayoola and Kuton (2009) in Lagos Lagoon and Soyinka and Kassem (2008) in Ologe Lagoon, Southern Nigeria. Fish live in water only flourish when the chemical and biological conditions of the water are suitable, such as, when the water is fairly free from pollution.

This research was designed to provide more information on the ichthyofauna of Igbokoda River, especially the abundance and seasonal variation done for the first time.

2. SPECIFIC OBJECTIVE

Determine the abundance, composition and seasonal variation of fish in Igbokoda River.

3. METHODS

Fish samples were collected from June, 2014 to November, 2015 at landing centre of fish men on the terminus. They were identified with keys and guides of Olaosebikan and Raji (1998), Idodo-Umeh (2003) and counted.

Statistical Analysis

Student T-test using SPSS software package and Microsoft Excel 2007 were used.

4. RESULTS

Thirty five species belonging to ten families were recorded during the study period, seven species of Cichlidae, four species of Clariidae, four species of Distichodontidae, two species of Bagridae, three species of Characidae, three species of Cyprinidae, two species of Channidae, seven species of Mormyridae, one species of Hepsetidae and Malapteruridae respectively (Table 1). *Clariasgariepinus and Heterobranchuslongifilis* (family: Claridae) dominated the fish fauna accounting for 7.9% and 7.2% of relative abundance respectively (Fig1), while the least abundant *Marcuseniusscyprinoidea* (family: Mormyridae) found only 0.4%. Clariidae family recorded the highest percentage abundance (29%) followed by Cichlidae family (20%).while the least family was Bagridae (5%) (Figure1). Clariidae recorded the highest percentage for rainy season value(168) and dry season value (33.4) respectively, while, Malapteridae family recorded the least(15) for dry season and Channidae recorded the least value (6) for the rainy season respectively Figure 2. There were no significant differences in abundance between rainy and dry seasons except *Chrysichythsfilamentosus, C. nigrodigitatus, Parachanna obscura, Ophiocephalus africanus, Clariasanguillaris Heterobranchusbidorsalis, and H.longifilis* (Table 1).

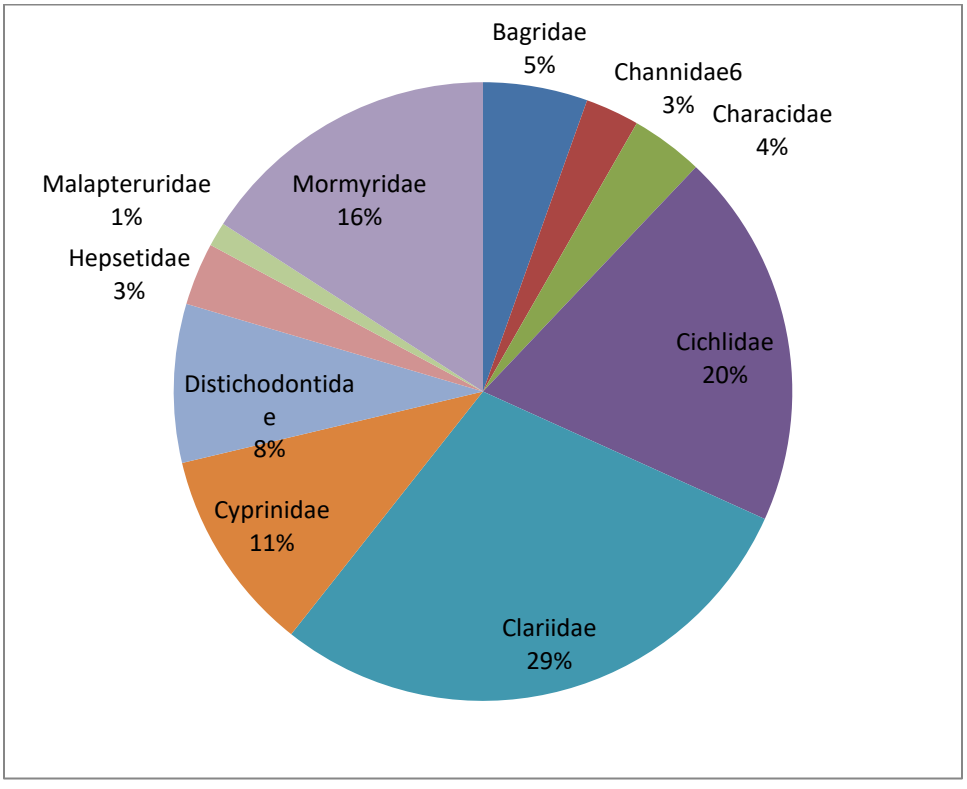

Figure 1 The percentage of fish abundance in Igbokoda River

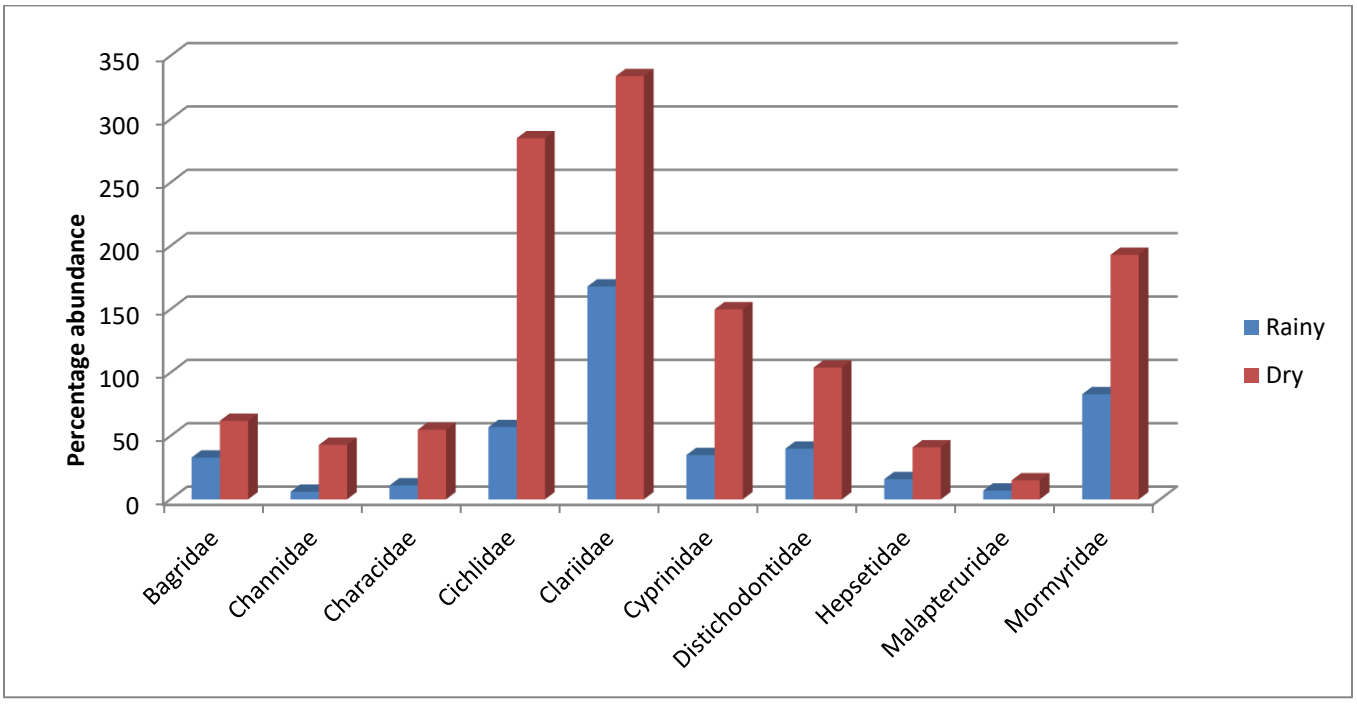

Figure 2

Seasonal variation in fish abundance (%) in Igbokoda River

Table 1

T-test showing relationship between rainy and dry seasons of fish species in Igbokoda River from June, 2014 to October, 2015

Species	T-value Rainy Season	T-value Dry Season	Significant
Chrysichyths filamentosus	1.75	7.5	0.50
C . nigrodigitatus	1.00	2.83	0.81
Parachanna obscura	0.33	4.33	0.71
Ophiocephalus africanus	0.17	2.83	0.11
Brycinus brevis	0.42	2.67	*0.00
B . nurse	0.25	3.50	*0.01

Micralestes occidetalis	0.25	3.00	*0.03
Hemichromis fasciatus	0.83	8.17	*0.01
Oreochromisaurea	0.92	5.17	*0.04
O. niloticus	0.58	9.00	*0.00
Sarotherodongalilaeus	0.92	8.67	*0.02
S. melanotheron	0.25	8.00	*0.00
Tilapia guineensis	0.42	3.50	*0.01
T. zilli	0.83	5.00	*0.04
Clariasanguillaris	3.08	13.00	0.13
C. gariepinus	4.42	14.00	0.65
Heterobranchusbidorsalis	2.75	14.83	0.44
H. longifilis	3.75	13.83	0.09
Barbusbynnioccidentalus	0.67	6.50	0.09
B. lagoensis	1.00	9.83	0.96
Labeosenegalensis	1.25	8.67	*0.00
Distichodusrostratus	0.83	4.17	*0.03
D. engycephalus	0.75	4.17	*0.02
Nannocharaxangsorgei	1.25	5.67	0.10
N. latifasciatus	0.50	3.33	*0.01
Hepsetidaeodoe	1.33	6.83	*0.00
Malapteruruselectricus	0.58	2.50	*0.04
Mormyrushasselquistic	1.33	6.50	*0.05
M. macrophthalus	1.33	7.83	0.63
M. rume	1.83	9.00	0.20
M. senegalensis	1.17	5.67	0.30
Marcuseniusabadii	0.42	1.17	*0.01
M. brucii	0.17	1.17	*0.04
M. cyprinoidea	0.67	0.83	*0.04

* Significantly different ($p<0.05$)

5. DISCUSSION

The fish species encountered included the fresh water of the families Cichlidae, Mormyridae, Claridae, Distichodontidae, Bagridae, Cyprinidae Characidae, Channidae, Hepsetidae and Malapteruridae. The thirtyfive (35) species of ten families of fish encountered in the present study

have been earlier reported to occur in Nigeria water bodies (Reed *et al.,* 1976; Idodo-Umeh, 2003; Obasohan and Oronsaye 2006). Babatunde and Raji (1998) had earlier reported occurrence and distributions of most of these species in Ogun River. However, distribution and abundance of fish in tropical water bodies have been variously attributed to several factors but principally water depth (Chapman and Kramer, 1991), water temperature (Agrermier and Kar, 1983), water transparency (Fagade and Olaniyan, 1974 and migratory behaviour of some of the fish species (Adebisi, 1988). The present abundance of fish species in Igbokoda River is more than 21 species reported by Nwadukwe (1995) in Lagos Lagoon This could be attributed to the abundance of algae which provided food for them. Akeem (1980) recorded some blue-green algae in the stomach of Tilapia species from the Black Johnson Lagoon, Sierra Leone. The relatively high abundance of tilapia might be attributed to the high abundance, distribution and diversity of phytoplankton. Tilapia are phytophagous (Fagade and Olaniyan, 1972; Ikusemiju and Olaniyan, 1977; Fagade, 1993). The dominance of the member of the family Cichlidae in Igbokoda River confirm that under uncontrolled conditions in most Nigeria water, they dominate the fish fauna (Ita and Balogun, 1983; Ita,1993).The higher abundance of the fish species during the dry season than the rainy could be attributed to low water level which increases catch. Ayoola and Kuton (2009) reported higher abundance of fish species at low level of water in Lagos during the dry season.

6. CONCLUSION AND RECOMMENDATIONS

This study on fish fauna of Igbokoda River is considered important which can be utilized as a platform for impact assessment, planning and implementation of policies for monitoring and effective development of Igbokoda River. The midstream and downstream stations of Igbokoda River which were slightly polluted confirmed that the residents people were without toilet facilities but all their faeces and other anthropogenic wastes were dropped into the river thus the common practice especially in Nigeria and other developing nations of using natural water bodies as disposal media for anthropogenic and feacal wastes poses a serious threat to the aquatic ecosystems. These could have accounted for the low zooplankton species diversity and relatively low diversity and abundance of macro benthos and fish in the midstream and downstream stations possibly showed that the river is under stress compared to what were obtained in the upstream station of the River. These are manifestations of the detrimental impacts of the anthropogenic waste dumps, sand mining and dredging activities on the ecology of Igbokoda River. The higher Biochemical Oxygen Demand and pollution indicator species indicated that the river is slightly polluted.in order to ensure sustainable management and conservation of aquatic environment and biodiversity as well as the socio-economic importance of aquatic resources in Igbokoda River, the following regulatory measures are therefore recommended;

Provision for adequate collection facilities

Adequate and proper collection facilities such as waste bin,waste bag collectors and incinerators should be made available, such that the habit of saddling the water bodies with their waste should be prevented.

Water utilization

The concept of waste to wealth syndrome should be put in place. The organic rich gut content of killed fish and some other waste could be utilized as source of organic fertilizer for agricultural purpose rather than being discharged into the natural water bodies.

Proper and Adequate monitoring

There should be regular monitoring of the discharge of anthropogenic wastes as well as the health status of the water bodies using physico-chemical study and biomonitoring by the environmental agencies. Such as, Nigeria Inland Water Ways Authority **(**NIWA)this will ensure compliance with the standard for discharge effluents as well as early detection of any devastation in the aquatic environment.

Public Enlightment

There should be enlightment and awareness programme organize through public workers for local residents on the environmental devastations that could result from dumping of untreated wastes into the natural water bodies as well as the benefit of adequate waste management measures.

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