



ICHTHYOFAUNAL ASSEMBLAGE OF BALANGA DAM GOMBE STATE, NIGERIA

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ABSTRACT

The ichthyofaunal identification of Balanga Dam has been carried out. Fish samples were collected from the local fishermen in two landing sites. Top and bottom set foul hook lines, gill and cast net of different mesh sizes were used for fish capturing. Fish species were preserved and transported to the laboratory for identification purpose. Different identification keys were used as reference materials during fish identification. The Dam show high ichthyofaunal diversity as its recorded 15 fish species belonging to 11 families. It is reveals that family Mormyridae had highest number of three (3) species, followed by Bagridae and Mochokidae with two (2) species each, while the remaining families had only one (1) species respectively. Research in to fish condition factor and water quality of the dam is needed to ascertain the general fish productivity of the Dam.

Keywords: Ichthyofauna, diversity, identification and Balanga Dam

INTRODUCTION

Fishing practice is attracting a lot of focus because it contributes to the world protein requirement (Nazeef and Abubakar 2013). The global level of fish supply is becoming insufficient as a result of pressure due to human population increase (Food and Agriculture Organisation, 1999). Fish protein is first class, inexpensive and generally desirable due to its rich nutritive value and mineral composition (Moses, 1990). With an annual increase of 2.1%; the Nigeria's population is growing at a faster rate which in turn exerts pressure on the dwindling fish resources. Hence, Nigeria is blessed with abundant fish resources because their natural water body is richest in West Africa in term of fish abundance (Meye and Ikomi, 2012). Apart from being a major source of high-

quality animal protein for human, the fish resources provide several socio-economic values such as job creation, raw materials for industries and also a means of recreational purposes (Yakub, 2012). The high biodiversity of fish is probably the main source of stability to many tropical fisheries and provide strong argument for conservation (King, 1992). Nigeria is blessed with various aquatic ecosystems; which include rivers, lakes, lagoons and marine environment. The fish yield of most Nigerian inland waters is generally on the decline for reasons that may range from inadequate management of the fisheries to degradation of the water bodies (Jamu and Ayinla, 2003).

Inland fisheries are extremely diverse and harvest a tremendous amount of biodiversity. Inland fisheries in Nigeria is said to contribute about 200,000 metric tons to the



total annual National fish production that stagnates at about 500,000 metric tons. Nigeria consumes about 1.3 million metric tons of fish a year including up to 700,000 metric tons of imported frozen fish (Miller, 2004). Nigeria has over 14 million hectares of inland waters, much of which lack proper management. The country could be self-sufficient in fish production and be a major exporter of fish if the over 14 million hectares of inland water bodies are developed and properly managed (Abiodun, *et al.*, 2005). Freshwater aquatic systems represent about 2-3% of the marine area, yet contain 40% of known fish species, some of this biodiversity are threatened or rare, and inland fish species have been identified as the most threatened group of vertebrates used by humans (Devin and John, 2008). Aquaculture can be a component of species recovery program if integrated in to a broader management framework. Inland fisheries provide food and employment in rural areas where few other options are available. Over 60 million people in developing countries are involved in aspects of small-scale inland fisheries, large quantity of the marine catches is reduced to fishmeal or oil used to raise farmed fish (Lymer *et al.*, 2008a). Tacon and Metian (2009) reported that 23.8 million tones or 29% total marine capture fisheries landing in 2006 were used as feed. Regarding contribution to rural nutrition, a large part of aquaculture and marine production may be sold on major markets and even exported, while inland fisheries generally produce low product that are consumed in the fishing household or are sold locally (Tacon and Metian, 2009). The fish stock diversity of any

country is directly dependent on the quality and quantity of water resources in the country (Bolorunduro, 2003)

Many studies have been carried out on the fish species diversity of various water bodies, these include Sikoki *et al.*, 2008 who reported seventeen (17) fish species belonging to fifteen (15) genera and eleven (11) families in Oni-Iyi Ukwu stream, Rivers State Nigeria. Mondal and Kaviraj (2009) also reported forty-nine (49) fish species belonging to twenty-three (23) families with eleven (11) species from two flood plains lakes of North 24 paragonas in west Bengal. Onuoha *et al.*, 2010 recorded twenty-six (26) fish species belonging to seven (7) families in Ntayinyang stream, Ikpa River in Itu Local Government Area, Akwa Ibom State. Abubakar *et al.* (2015) also recorded twenty-six (26) fish species belonging to fourteen (14) families in Dadin kowa dam, Gombe state. Due to lack of information on the fish diversity of Balanga Dam, this study aimed at determining the diversity of fish species (ichthyfauna) of Balanga Dam, Gombe State Nigeria.

MATERIALS AND METHOD

Description of the Study Area

The dam is located in Balanga local government area of Gombe state. Its lies on latitude 10° 16'N and longitude 11° 16'E of the greenwich meridian. It is bordered by Reme, Tula, Dong, and Junge villages respectively. The dam was built in 1980's on river Gongola with the goal of providing water for irrigation practice and electricity. The dam is currently providing water for

irrigating 1000 hectares of farmland, fishing activities is taking place in the dam throughout the year.

Fish Sampling Protocol

Two landing sites were used for fish sampling. Samples were obtained from the local fishermen at each of the landing sites. Fishing gears that were used by the local fishermen includes Top and Bottom set foul hook line, gill and cast nets of different mesh sizes (2, 2.5, and 3 inches) (Abubakar *et al.*, 2015). Representatives of each fish species were preserved in a transporting vessel prepared with ice and brought to the laboratory for further analysis. Fish species identification was done with the aid of reference materials (Babatunde and Raji, 1998; Anthony, 1982 and Holden and Reed, 1972).

Data Analysis

All data were presented in tables and simple percentages were employed to analyse the results.

RESULTS

The result of fish species identified is presented in Table 1. A total of fifteen (15) fish species, representing eleven (11) families were identified. The table also revealed that family Mormyridae had the highest number of fish species with three (3) individuals, followed by families Mochokidae and Bagridae with two (2) fish species respectively. The remaining families which are Alestidae, Claridae, Cichlidae, Protopteridae Claroteidae, Gymnarchidae

Malapteridae and Schilbidae had only one species representing each of them.

Table 1: Fish species identified in Balanga Dam, Gombe State Nigeria

Families	Fish species	Common names
Alestidae	<i>Micralestes elongates</i>	African tetras
Bagridae	<i>Bagrus bayad</i> <i>Bagrus docmac</i>	Bagrid catfish Bagrid catfish
Claridae	<i>Clarias gariepinus</i>	African catfish
Cichlidae	<i>Oreochromis niloticus</i>	Tilapia
Claroteidae	<i>Auchenoglanis occidentalis</i>	Armoured catfish
Gymnarchidae	<i>Gymnarchus niloticus</i>	African knife fish
Mormyridae	<i>Mormyrus rume</i> <i>Mormyrus anguilloids</i> <i>Mormyrus senegalensis</i>	Snout fish Snout fish Snout fish
Malapteridae	<i>Malapterirus electricus</i>	Electric fish
Propteridae	<i>Protopterus annectens</i>	Lung fish
Schilbidae	<i>Schilbe mytus</i>	African butter catfish
Mochokidae	<i>Synodontis ocellifer</i> <i>Synodontis schall</i>	Squeakers Squeakers

The percentage composition of various fish families identified in Balanga dam is presented in Table 2. Family Mormyridae constituted 20% of the fish identified, followed by Bagridae and Mochokidae with 13.33% respectively. The remaining families had 6.66% of the fish species identified.

Table 2: Percentage composition of various families of fish identified in Balanga Dam, Gombe State Nigeria.

Families	No. of fish species identified	Percentage
Alestidae	1	6.66
Bagridae	2	13.33
Claridae	1	6.66
Cichlidae	1	6.66
Claroteidae	1	6.66
Gymnarchidae	1	6.66
Mormyridae	3	20
Malapterdae	1	6.66
Protopteridae	1	6.66
Schibidae	1	6.66
Mochokidae	2	13.33
TOTAL	15	100%

Table 3 show the composition of fish species identified in Balanga dam, it indicated that *Oreochromis niloticus*, *Micralestes elongates*, *Auchenoglanis occidentalis*, and *Clarias gariepinus* had 29.33%, 25.80%, 22.13% and 17.83% respectively, while the remaining fish species had less than 2% of the total catches. The table further reveals the percentage composition of fish species in which *Oreochromis niloticus*, *Micralestes elongates*, *Auchenoglanis occidentalis* and *Clarias gariepinus* had 29.33%, 25.80%, 22.13%, and 17.83% respectively. *Bagrus bayad*, and *Gymnarchus niloticus*, had 1.44%, 1.08%, and all other remaining fish species had less than one percent of the total catches.

Table 3: Percentage composition of fish species identified in Balanga Dam, Gombe State Nigeria.

Fish Species	No. Identified	% fish identified
<i>Micralestes elongates</i>	570	25.80
<i>Bagrus bayad</i>	32	1.74
<i>Bagrus docmac</i>	11	0.49
<i>Clarias gariepinus</i>	394	17.83
<i>Oreochromis niloticus</i>	648	29.33
<i>Auchenoglanis occidentalis</i>	489	22.13
<i>Gymnarchus niloticus</i>	24	1.08
<i>Mormyrus rume</i>	7	0.31
<i>Mormyrus anguiloids</i>	5	0.22
<i>Mormyrus senegalensis</i>	6	0.27
<i>Malapterirus electricus</i>	6	0.27
<i>Protopterus annectens</i>	6	0.27
<i>Schilbe mytus</i>	1	0.04
<i>Synodontis ocellifer</i>	2	0.09
<i>Synodontis schall</i>	3	0.13
Total	2204	100

Relative abundance of the fish species identified in Balanga Dam indicated that, the dam dam recorded its highest relative abundance in the month of June with the total number of 793 individuals captured. In July, the total number of fish capture is 736, whereas the least number of fish captured was in the month of May (Table 4).

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Table 4: Relative abundance of fish species identified in Balanga Dam, Gombe State Nigeria

Fish species	Months			Total
	May	June	July	
<i>Micralestes elongates</i>	270	200	100	570
<i>Bagrus bayad</i>	10	12	10	32
<i>Bagrus docmac</i>	7	2	2	11
<i>Clarias gariepinus</i>	70	111	213	394
<i>Oreochromis niloticus</i>	200	250	198	648
<i>Auchenoglanis occidentalis</i>	100	189	200	489
<i>Gymnarchus niloticus</i>	9	15	0	24
<i>Mormyrus rume</i>	2	1	4	7
<i>Mormyrus anguiloids</i>	1	3	1	5
<i>Mormyrus senegalensis</i>	2	3	1	6
<i>Malapterirus electricus</i>	3	0	3	6
<i>Protopterus annectens</i>	7	4	0	11
<i>Schilbe mytus</i>	0	0	1	1
<i>Synodontis ocellifer</i>	2	0	0	2
<i>Synodontis schall</i>	2	0	1	3
Total	655	793	736	2204

DISCUSSION

The results of this study showed that the dam has a rich in fish diversity with fifteen (15) species representing eleven (11) families as compared to nearby water bodies that similar studies has been conducted, these include the work of Nazeef and Abubakar, (2013) who identified fifteen (15) fish species belonging to eleven (11) families in Dadin Kowa dam, Gombe State Nigeria. Okere (1990) who recorded thirteen (13) families and twenty-six (26) species in Otamiri River, Abia State Nigeria. Udodiong (1991) reported on species composition of three (3) streams in Akwa Ibom as follows; in Udom stream seventeen (17) representing ten (10) families were recorded, nineteen (19) fish species belonging to twelve (12) families were recorded in Nung Oku stream. Onuoha *et al.*, (2010) recorded twenty-six (26) fish species belonging to seven (7) families in Ntayinyang stream. Sikoki *et al.*, (2008) investigated the fish assemblages of Oni-Iyi-Ukwu stream in south eastern Nigeria recorded seventeen (17) species belonging to eleven (11) families.

The occurrence of higher diversity of families Mormyridae, Bagridae and Mochokidae in this study might be attributed to their competitive advantage over other fish species in the Dam. This agrees with Udoidiong and King (2000) who reported that low population of Malapteridae is related to their competitive disadvantage against other fish species.

In respect to relative abundance, *Oreochromis niloticus* is the most dominant fish species with 648 number of individuals among the total catch, followed by

Micralestes elongates with 489 individuals, *Clarias gariepinus* had 394 individuals and the remaining fish species had less than 50 individuals among the total catch. The higher relative abundance of *Oreochromis niloticus* might be related to their excessive breeding method among the tropical fish species (Ali and Abubakar, 2015). This is in agreement with many other researchers, this include the work of Holden and Reed, 1972 who reported that *Oreochromis sp.* constitutes 90% of the total fish species identified in Sokoto river. Anthony (1982) also reported that *Oreochromis sp.* constituted up to 95.4% of the total catch in Auree reservoir of Plateau state. Miller (2004) and Abubakar (2006) reported *Oreochromis niloticus* as the most abundant fish species in Lake Geriyo Adamawa state.

CONCLUSION

Balanga dam is said to be diverse in term of fish species abundance with up to 15 species identified during this preliminary study. It is also revealed that, there is high fish abundance in the month of June as compared to the months of May and July. Information on water quality and general well-being (condition factor) of the fish species is highly needed in order to maintain the welfare of the fishes and ascertain the general productivity of the dam.

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