



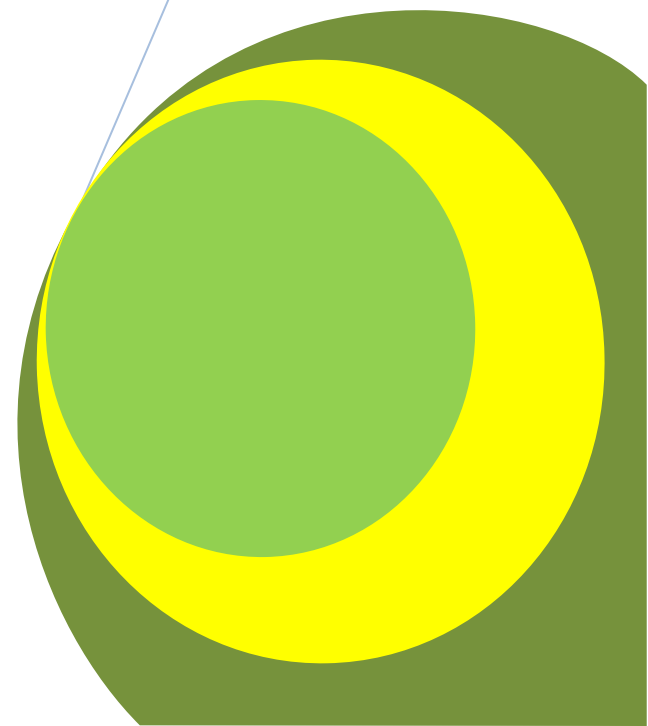
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## **Diversity and Condition Factor of Fish Species of Dadin Kowa Dam, Gombe State, Nigeria**

By

**Nazeef S.  
Abubakar U. M.**



*Research Article*

# Diversity and Condition Factor of Fish Species of Dadin Kowa Dam, Gombe State, Nigeria

**\*Nazeef S. and Abubakar U. M.**

Department of Biological Sciences, Gombe State University, P. M. B. 127, Gombe, Nigeria.

\*Corresponding Author's Email: snaxyph@yahoo.com

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**ABSTRACT**

The diversity and condition factor of fish species of Dadin Kowa Dam were studied over a period of six (6) months (February to July, 2013). Out of the fifteen fish species identified, family Mormyridae had the highest number of three (3) species, followed by families Bagridae and Characidae with two (2) species representing each. *Hydrocynus brevis* (family Characidae) ranked 22.14%, then *Labeo senegalensis* (family Cyprinidae), *Mormyrus senegalensis* (family Mormyridae), *Schilbe mytus* (family Schilbedae) with 17.40%, 17.01% and 13.05% of the total fish species identified. 60% of the fish species identified had their condition factors within the range of 0.1 to 1.0; whereas the remaining 40% of the fish had the condition factor greater than 1.0. Adequate measures need to be taken into account as most of the landed catches were juveniles and sub-adult which could render the water body less productive in a near future.

**Keywords:** Diversity, Condition factor, fish species, Dadin Kowa Dam.

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**INTRODUCTION**

Fishing practice is attracting a lot of focus because it contributes significantly to the world proteins requirement (Moses, 1990). Fish is a high quality food, its content of protein matter is important. It is rich in vitamins and contains variable quantities of fat, and calcium for human health (Moses, 1990). The protein is first class and inexpensive and its composition and consumption is desirable (Moses, 1990).

Nigeria is blessed with abundant natural water bodies with abundant fish resources. Nigerian freshwater bodies are the richest in West Africa in terms of fish abundance (Meye and Ikomi, 2008). The fish resources, apart from being a major source of high quality animal protein for man, provide several socio-economic values as sources of job opportunities and raw material for some industrial activities as well as recreational purposes (Yakub, 2012).

Nigeria's populations live near water bodies such as lakes, lagoons, reservoirs, rivers, swamps and coastal lagoons. Many depend heavily on the resources of such water bodies for their main source of animal protein and family income (Abubakar *et al.*, 2006).

Ita (1993) reported 268 different species in 34 well known Nigerian freshwater rivers, lakes, reservoirs, which constitute about 12% of Nigeria's total surface area of about 98,185,000 hectares. However, according to Jamu and Ayinla (2003), the yields of most of these inland waters are generally on the decline due to environmental degradation such as water pollution and improper or poor management of fisheries resources. Environmental Protection Agency (EPA) recommended species richness and relative abundance as ecological risk assessment in aquatic ecosystem (EPA, 2007). Ita (1993) reported an estimated 230 species in Nigerian rivers.

Odo *et al* (2009) reported an estimated fifty two (52) fish species belonging to seventeen (17) families from Anambra River, Nigeria. The fisheries and fish resources of Nigeria are not only of considerable economic importance but they are also making a significant contribution to national food security and as well providing a major source of employment in rural areas. The fish stock diversities are directly dependent on the quality and quantity of water resources in the country (Bolorunduro, 2003).

Condition factor is a useful index for the monitoring of feeding intensity, age, and growth rates in fish (Oni *et al.*, 1983). Condition factor is strongly influenced by both biotic and abiotic environmental conditions and can be used as an index to assess the status of the aquatic ecosystem in which fish live (Afamdi, 2005). Condition factors of different tropical fish species were investigated and reported by Bakare (1970), Saliu (2001) Lizama *et al* (2002) and similar studies particular to cichlid fish including, Siddiqui (1977), Welcomme (1979), Fagade (1978, 1983), Dadzie and Wangila (1980), Arawowomo (1982) and Oni *et al.*, (1983).

This research is aimed at determining the diversity and condition factor of fish species in Dadin Kowa Dam.

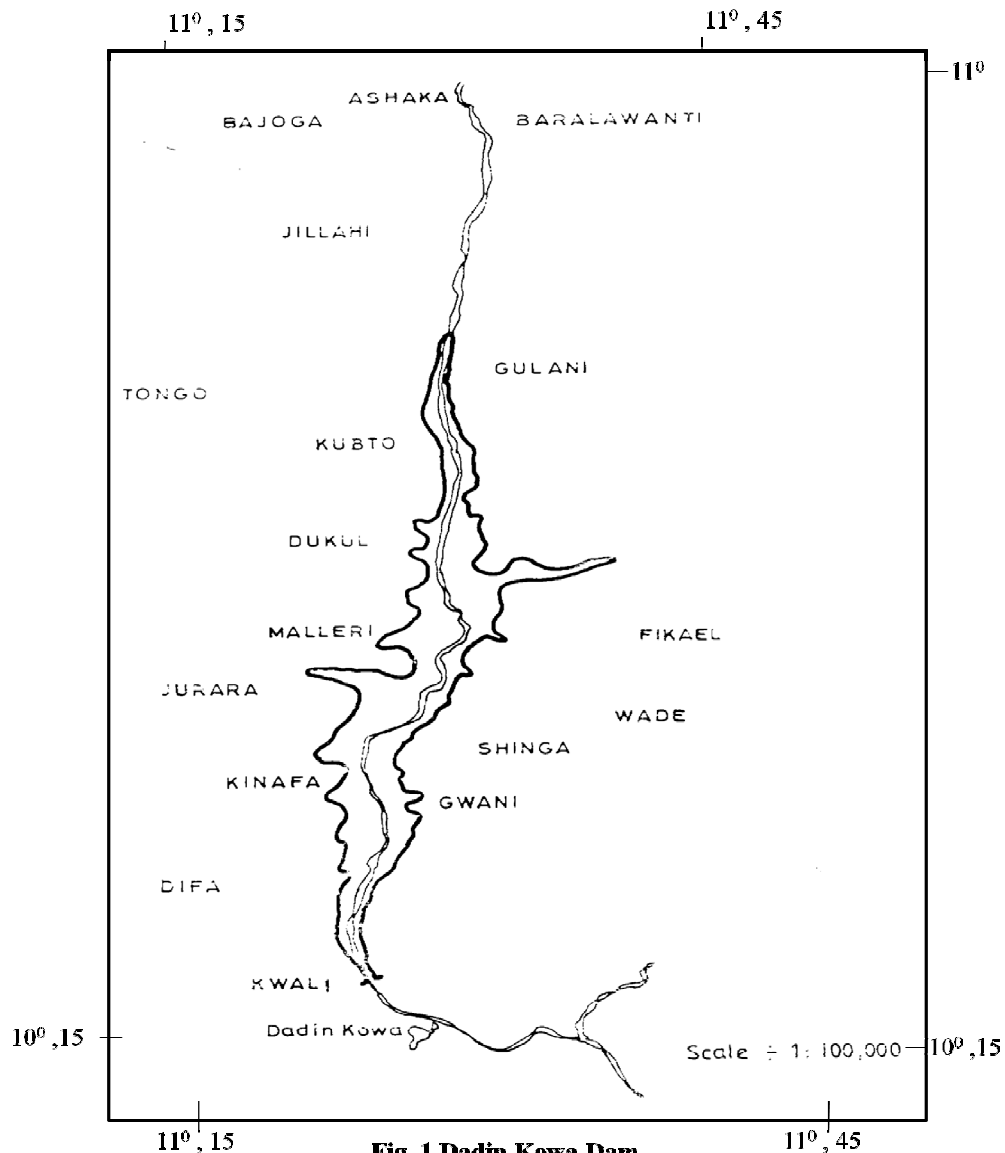
## MATERIALS AND METHODS

Dadin Kowa Dam is located 5km North of Dadin Kowa village (about 37km from Gombe town, along Gombe-Biu road) in Yamaltu Deba local Government Area of Gombe State (Figure 1). The area lies within longitude  $11^{\circ} 30' E$  and  $11^{\circ} 32' E$ , and Latitude  $10^{\circ} 17'$  and  $10^{\circ} 18' N$  of the equator (UBRDA, 1980).

Fish sampling were carried out fortnightly from February to July, 2013 by using gillnets of different mesh sizes (2.0, 2.5, 3.0 inches). 10% formalin was used for sample preservation before been transported to the laboratory where the fish species identification was performed with the aid of reference materials (Holden and reed, 1972., Anthony, 1982., Babatunde and Raji, 1998). Samples were weighed to the nearest 0.1g using weighing balance. The standard lengths were measured to the nearest 0.1cm on a measuring board. Fulton's condition factor was calculated from the expression (Bagenal, 1978)

$$K = 100W/L$$

Where W is the whole body weight in grams and L is standard length in centimetres.



**Fig. 1 Dadin Kowa Dam .**  
Source: U.B.R.B.D.A, (1980)

## RESULTS

The study reveals that fifteen (15) species representing eleven (11) families has been identified (Table 1), it also shows that family Mormyridae had the highest number of three (3) species, followed by Bagridae and Characidae with two (2) species representing each.

Table two (2) contains the percentage composition of fish species identified in Dadin-Kowa in Dadin Kowa Dam. The table shows that *Hydrocynus brevis*, *Labeo senegalensis*, *Mormyrus senegalensis*, and *Schilbe mystus* had 22.14%, 17.48%, 17.01%, and 13.05% of the total fish species identified. This is then accompanied by *Momyrus rume*, *Bagrus bayad*, *Clarias lazera*, and *Synodontis ocellifer* with 6.25%, 5.12%, 4.66%, and 3.96% of the total fish species identified. The remaining fish species had less than 3.0% of the total fish species identified.

**TABLE 1: FISH SPECIES IDENTIFIED IN DADIN-KOWA DAM**

Family	Species identified
Bagridae	<i>Bagrus bayad</i> <i>Bagrus docmac</i>
Characidae	<i>Alestes leuciscus</i> <i>Hydrocynus brevis</i>
Cichlidae	<i>Oreochromis niloticus</i>
Citharinadae	<i>Citharinus citharus</i>
Claridae	<i>Clarias lazera</i>
Claroteidae	<i>Auchenoglanis occidentalis</i>
Cyprinidae	<i>Labeo senegalensis</i>
Mochokidae	<i>Synodontis ocellifer</i>
Mormyridae	<i>Mormyrus sanguilloides</i> <i>Mormyrus rume</i> <i>Mormyrus senegalensis</i>
Schilbedae	<i>Schilbe mystus</i>
Polypteridae	<i>Polypterus ansorgei</i>

**TABLE 2: PERCENTAGE COMPOSITION OF FISH SPECIES IDENTIFIED IN DADIN-KOWA DAM**

Fish species	Number identified	Percentage (%)
<i>Alestes leuciscus</i>	12	2.79%
<i>Auchenoglanis occidentalis</i>	06	1.39%
<i>Bagrus bayad</i>	22	5.12%
<i>Bagrus docmac</i>	04	0.93%
<i>Citharinus citharus</i>	06	1.39%
<i>Clarias lazera</i>	20	4.66%
<i>Hydrocynus brevis</i>	92	22.14%
<i>Labeo senegalensis</i>	72	17.48%
<i>Mormyrus anguilloides</i>	02	0.46%
<i>Mormyrus rume</i>	28	6.52%
<i>Mormyrus senegalensis</i>	73	17.01%
<i>Oreochromis niloticus</i>	12	2.79%

<i>Polypterus ansorgei</i>	01	0.23%
<i>Schilbe mystus</i>	56	13.05%
<i>Synodontis ocellifer</i>	17	3.96%
<b>Total</b>	<b>429</b>	<b>100%</b>

The weight and length of the fish species identified in Dadin-Kowa Dam is presented in Table 3. The table also shows the relationship between the weight and length (condition factor) of the fish species identified.

Table 4 shows the percentage (%) condition factor (k) of the fish species identified in Dadin-Kowa Dam. The table revealed that *Synodontis ocellifer*, *Oreochromis niloticus*, *Polypterus ansorgei*, and *Schilbe mystus* had 11.47%, 10.20%, 9.75%, and 8.48% respectively, followed by *Hydrocynus brevis* (7.39%), *Citharinus citharus* (7.27%), *Mormyrus senegalensis* (6.37%), *Alestes leuciscus* (6.02%), *Mormyrus rume* (5.42%) and *Bagrus docmac* (5.10%). The remaining fish species had less than 5.0% (Table 6). The table also reveals that 40% (6 species out 15) of the fish species had their K values above 1.0, while the remaining percent (60%) had their K values from 0.1 to 1.0 respectively.

**TABLE 3: WEIGHT-LENGTH RELATIONSHIP OF FISH SPECIES IDENTIFIED IN DADIN-KOWA DAM**

<b>Fish species</b>	<b>Weight(g)</b>	<b>Length(cm)</b>	<b>Condition factor(K)</b>
<i>Alestes leuciscus</i>	215	28	0.95
<i>Auchenoglanis occidentalis</i>	315	35	0.73
<i>Bagrus bayad</i>	327	38	0.59
<i>Bagrus docmac</i>	100.5	23	0.80
<i>Citharinus citharus</i>	202	26	1.14
<i>Clarias lazera</i>	189	29	0.77
<i>Hydrocynus brevis</i>	32	14	1.16
<i>Labeo senegalensis</i>	25	15	0.70
<i>Mormyrops anguilloides</i>	520.5	41	0.75
<i>Mormyrops rume</i>	309	33	0.85
<i>Mormyrus senegalensis</i>	275	30	1.00
<i>Oreochromis niloticus</i>	54	15	1.60
<i>Polypterus ansorgei</i>	104	19	1.51
<i>Schilbe mystus</i>	23	12	1.33
<i>Synodontis ocellifer</i>	229	23	1.80
<b>Total</b>	<b>2824</b>		<b>15.68</b>

**TABLE 4: PERCENTAGE CONDITION FACTOR (K) OF FISH SPECIES IDENTIFIED IN DADIN-KOWA DAM**

Fish species	Condition factor (K)	Percentage condition factor (%)
<i>Alestes leuciscus</i>	0.95	6.05%
<i>Auchenoglanis occidentalis</i>	0.73	4.65%
<i>Bagrus bayad</i>	0.59	3.76%
<i>Bagrus docmac</i>	0.80	5.10%
<i>Citharinus citharus</i>	1.14	7.27%
<i>Clarias lazera</i>	0.77	4.91%
<i>Hydrocynus brevis</i>	1.16	7.39%
<i>Labeo senegalensis</i>	0.70	4.46%
<i>Mormyrops anguilloides</i>	0.75	4.78%
<i>Mormyrops rume</i>	0.85	5.42%
<i>Mormyrus senegalensis</i>	1.00	6.37%
<i>Oreochromis niloticus</i>	1.60	10.20%
<i>Polypterus ansorgei</i>	1.51	9.75%
<i>Schilbe mystus</i>	1.33	8.48%
<i>Synodontis ocellifer</i>	1.80	11.47%
Total	15.68	100%

## DISCUSSION

The result shows that the Dam has a rich Ichthyofauna complex with fifteen (15) species and eleven (11) families compared with other water bodies where similar studies had been carried out; for instance in Gubi reservoir of Bauchi State, only seven (7) family were identified (Oguzie, 1982). The result of this study agrees with that of many researchers which include (Ekeanyanwu, 1980) in river Delmi Jos, where seven (7) genera were identified. (Anthony *et al.*, 1986) recorded four species in Auree reservoir near Plateau state. Eleven species were identified in lake Botsumtwi, Ghana (Whyte, 1975). Abdullahi (2005) reported 26 species identified in River Benue around Boronji area. Dankishiya (1991) identified 31 species in Lake Geriyo. Akanbi (2011) identified 26 species in Ogun estuary, Ogun state.

From the condition factor of the fifteen (15) fish species examined, it was observed that 60% (9 species out of 15) fish species had their K values within the range of 0.1 to 1.0, a total of 40% of fish species had condition factor greater than 1.0. According to Lagler (1958), it has been found out that the value of K is not constant for individuals; species, populations, but is subject to wide variations for fish of average natural conditions. The K-factor should be equal to 1, while <1 and >1 indicate below and average conditions respectively. Wade (1992) stated that condition factor greater or equal to one is good. This suggests that the condition factor for Dadin-Kowa Dam compared to lagoons affected by season and salinity was favourable to most of the species in the Dam.

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