BIOMETRY AND COMPOSITION OF FISH SPECIES IN OWENA RESERVOIR, ONDO STATE, NIGERIA

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ABSTRACT

A survey of fish species present in Owena reservoir was conducted between October 2004 and March 2005. Fish samples were taken from the catch of the fishermen operating in the reservoir. The results of the survey showed that 14 fish species belonging to seven families were recorded. Two families namely Characidae and Clariidae constituted the dominant fish families in the reservoir. Among the Characidae, Brycinus nurse (23.1%) and among the Clariidae family, Clarias gariepinus (22.8%) were dominant. Other fish species with significant abundance were Sarotherodon galilaeus (9.3%), Parachanna obscura (8.0%), Clarias anguillaris (7.7%) and Oreochromis niloticus (6.4%). The meristic features of the two most abundant fish species caught are as follows: Brycinus nurse had two dorsal spines with eight dorsal fins, two anal spines with eleven anal fins, 25 caudal fins, one pectoral spine and 13 pectoral fins and two ventral spines with seven ventral fins. Clarias gariepinus had 75 dorsal fins, 31 anal fins, 10 caudal fins, six pectoral fins and five ventral fins. The morphometric features of the two most abundant fish species are: Brycinus nurse: total length: 312mm, standard length: 255mm, head length: 60mm, body length: 90mm and body girth: 190mm. Clarias gariepinus: total length: 265mm, standard length: 240mm, head length: 62mm, body length: 62mm and body girth: 130mm.

Keywords: Biodiversity, biometry, Owena reservoir, survey, ichthyofauna

INTRODUCTION

The fish yields of most Nigerian inland waters are generally on the decline [9]. The decline of these fisheries has been attributed to a wide range of causes ranging from inadequate management of the fisheries resources to environmental degradation of the water bodies. For sustainable exploitation of these fisheries resources, a crucial management tool is to have a comprehensive understanding of the ichthyofaunal composition of the water bodies.

The freshwater food fishes found in Nigeria are about 268 different species [2]. They inhabit over 34 well-known freshwater bodies, (rivers, lakes and reservoirs), which constitute about 12% of Nigeria's total surface area put at 94,185,000ha [8]. Several large rivers including rivers Owena, Ogbese, Omi, Oluwa, Ose and Ero cross Ondo-State.

Fish stocks in rivers are generally replenished from their adjacent flood plains after each flood season during which fish breed. Therefore, any natural phenomenon such as drought or artificial activities such as dam construction, which eventually affect the natural cycle of flooding, will certainly undermine fish species diversity both in lakes and wetlands, [15]. Considering this fact, therefore, that lakes, wetlands and reservoirs are supplied with fish by their inflowing rivers, the rivers would be characterized by higher species diversity [8].

[14] produced a key to some of the freshwater fishes of Nigeria (as adopted from [3] and [17]. The key agreed with the identification method published by [12]. The keys are commonly used to identify the families and species of fishes using the dichotomous identification method. [2] published a list of African freshwater fishes to include 976 species, referable to 185 genera and 43 families. But [17] produced a list of 181 species of fishes that could be found in Nigeria inland waters.

White reported that there are about 145 species of fish in the areas of the Kainji lake basin. The report also revealed that Anambra, Kaduna and Sokoto/Rima rivers have 23, 28 and 22 species respectively in them. Cross River, Ogun and Osun rivers have 39, 23 and 23 fish species. [8] reported that an estimated 230 species of fish have

Table 1: Species Composition and Relative Abundance of the Ichthyofauna of Owena Reservoir.

Species	Family	No of Specimens	% by No
Heterotis niloticus	Osteoglossidae	60	3.2
Mormyrus rume	Mormyridae	42	2.2
Mormyrus macrophthalamus	Mormyridae	24	1.3
Hepsetus odoe	Hepsetidae	90	4.8
Brycinus nurse	Characidae	432	23.1
Chrysichthys nigrodigitatus	Claroteidae	54	2.9
Auchenoglanis occidentalis	Claroteidae	30	1.6
Heterobranchus longifilis	Clariidae	42	5.4
Clarias gariepinus	Clariidae	426	22.8
Clarias anguillaris	Clariidae	144	7.7
Malapterurus electricus	Malapteruridae	24	1.3
Parachanna obscura	Channidae	150	8.0
Oreochromis niloticus	Cichlidae	120	6.4
Sarotherodon galilaeus	Cichlidae	174	9.3
Total		1872	100

been recorded from the rivers of Nigeria, but no record is available on the species present in Rivers, Benin, Owena and Calabar which all empty directly into the ocean.

The Owena reservoir is known to house many species of freshwater food fishes and do contribute significantly to fish production in Ondo-State [6]. Of the 19,608 tonnes of fish production from Ondo State in the year 2000 [7], appreciable percentage came from Owena reservoir. Many species have been caught in this reservoir with no record on their abundance. This paper provides preliminary data on the composition and relative abundance of the ichthyofauna of Owena reservoir in Ondo State.

METHODOLOGY

Owena reservoir is situated across Owena River, which is located in the suburb of Owena town in Ifedore Local Government Area of Ondo-State, between latitude $7^0$15`N, longitude $5^0$ 5`E and latitude 7^0 4`N, longitude $4^0$ 47`E in Western Nigeria. The reservoir is about 300m long and 9m in its deepest part, with the capacity of approximately 600,000m^3 and the catchments area controlled by the reservoir is 790km^2 [11].The reservoir was primarily constructed as a source water supply to the people. Threoboma cacao and Cola acuminata species, some forest trees and wild grasses constitute the vegetation around the reservoir. Data for this study was based on records of fish catches by local fishermen taken through the months of October 2004 and March 2005. The fishing gears used were of four different types i.e. hook and line of size 13, cast-nets, gill-nets and cages of mesh sizes of 50mm, 75mm, and 100mm.The species of fishes caught were identified using the Dichotomous identification method as arranged by [3] and [17] and adopted by [14].

Preservation of fish samples was in 10% formalin. The surface water temperature of the reservoir was taken with the use of dry mercury bulb thermometer and the pH was monitored using the pH meter on a daily basis. Samples from which data was gathered were selected randomly from the different species of fishes found in the reservoir. The "Dichotomous identification method" of fish species determination as arranged by [3] and [17] and adopted by [14] was used to identify the species of fishes present in the catches from the reservoir. This was achieved by taking account of the meristic features of the

Table 2: Percentage distribution of fish species by sex in Owena Reservoir, Nigeria.

Species	Males (%)	Females (%)
Heterotis niloticus	6	94
Mormyrus rume	4	96
Mormyrus macrophthalmus	4	96
Hepsetus odoe	5	95
Brycinus nurse	7	93
Chrysichthys nigrodigitatus	9	91
Auchenoglanis occidentalis	5	95
Heterobranchus longifilis	7	93
Clarias gariepinus	9	91
Clarias anguillaris	2	98
Malapterurus electricus	4	96
Parachanna obscura	12	88
Oreochromis niloticus	20	80
Sarotherodon galilaeus	9	91

various fishes. These features were those of the dorsal, anal, caudal, pectoral and ventral fin rays and spines where present.

Measurements were also taken on sampled fishes to aid the identification process. The meristic features and the morphometric data of 10 randomly selected fish samples per species were taken. These measurements include the total length of the fish (TL), measured from the mid-tip of the snout to the lateral mid-base of the caudal fin, the head length (HL) was measured from the mid-tip of the snout to the postero-dorsal junction of the membranous margin of the gill opening with the body, the body depth (BD) and body girth (BG). The total number of individual species of fish caught from the reservoir was recorded; this enabled the determination of the relative abundance of the various species in the reservoir. The main system of classification of fish species that were caught in the reservoir was that of [13] as adopted by [2] and [1].

RESULTS AND DISCUSSION

Results of the survey showed that 14 fish species belonging to nine families were recorded. Two families namely Characidae and Clariidae constituted the dominant fish families in the reservoir. Among the Characidae, Brycinus nurse was the most abundant fish species with 23.1% abundance while among the Clariidae, Clarias gariepinus was the most abundant species with 22.8% abundance. In all the families present, the females were more abundant than the males. Table 1 shows the classification of fish species caught in the reservoir and their relative abundance. The percentage occurrence of fish species by sex is presented in Table 2. For all the species, the percentage of females was higher than the males. The meristic features and the morphometric data of 10 randomly selected fish samples per species were taken and these are presented in Tables 3 and 4. They are considered to be important characters on which species identification are based. In Table 3, numerals represent the number of fin rays present on individual species, while roman figures represent the number of spines present on the fins of respective species indicated. These species have spines on their fins while the other species are spineless.

The catch composition shows that Characidae and Clariidae families were dominant in the reservoir. Among the Characidae, B. nurse (23.1%) was the most abundant and for the Clariidae, C. gariepinus (22.8%) was the dominant species out of the three species caught.

Table 3: Meristic Features of fish species caught in Owena Reservoir, Nigeria.

Species	No of Fishes	D. fin	A. fin	C. fin	P. fin	V. fin
Heterotis niloticus	10	24	27	12	5	5
Mormyrus rume	10	81	18	28	9	5
Mormyrus macrophthalmus	10	79	18	32	16	5
Hepsetus odoe	10	ii, 7	i, 10	28	i, 14	i,10
Brycinus nurse	10	ii, 8	ii, 11	25	i, 13	ii, 7
Chrysichthys nigrodigitatus	10	i, 9	i, 14	19	i, 7	i, 4
Auchenoglanis occidentalis	10	i, 7	iii, 6	25	i, 9	7
Heterobranchus longifilis	10	34	48	20	6	7
Clarias gariepinus	10	75	31	10	6	5
Clarias anguillaris	10	75	60	14	8	5
Malapterurus electricus	10	-	10	17	8	7
Parachanna obscura	10	41	29	14	16	6
Oreochromis niloticus	10	xv, 13	iv, 11	22	9	5
Sarotherodon galilaeus	10	xvi, 12	iii, 9	14	15	i, 5

Roman Figures represent number of spines.
Numerals represent number of fin rays.
D. Fin : Dorsal Fin
A. Fin : Anal Fin
C. Fin : Caudal Fin
P. Fin : Pectoral Fin
V. Fin : Ventral Fin

Table 4: Morphometric Features of fish species caught in Owena Reservoir, Nigeria.

Species	No of Fishes measured	TL	SL	HL	BD	BG
Heterotis niloticus	10	-	-	-	-	-
Mormyrus rume	10	240	190	70	80	170
Mormyrus macrophthalmus	10	160	130	40	35	72
Hepsetus odoe	10	340	275	80	70	150
Brycinus nurse	10	312	255	60	90	190
Chrysichthys nigrodigitatus	10	245	205	70	60	135
Auchenoglanis occidentalis	10	150	140	50	40	100
Heterobranchus longifilis	10	295	260	70	65	130
Clarias gariepinus	10	265	240	62	62	130
Clarias anguillaris	10	260	230	65	65	120
Malapterurus electricus	10	250	200	60	85	165
Parachanna obscura	10	210	180	35	34	72
Oreochromis niloticus	10	270	220	80	100	210
Sarotherodon galilaeus	10	210	170	60	70	160

All measurements are in millimeters (mm).
TL: Total Length
SL: Standard Length
HL: Head Length
BD: Body Length
BG: Body Girth

However, the results of this study with respect to catch composition disagreed with other studies conducted on a number of lakes in Nigeria. Analysis of catch in a study in IITA Lake, Ibadan by [16] revealed that O. niloticus and S. galilaeus were dominant. In similar studies conducted on lakes Kainji and Tatabu, both in Niger State, by [5] and [8] respectively, the cichlid species were found to be dominant. The variation in this study could be due to the fact that many carnivorous fish species were present in abundance in the reservoir, which feed on the cichlids thereby reducing their population. S. galilaeus was the third most abundant species in the reservoir at the time of the survey. In addition to the fish species found in the reservoir, are some other forms of aquatic fauna. Sudanonantes africana, the crab occurs in large quantity, as well as snails, crocodiles and snakes. This confirms that natural aquatic environment house a variety of aquatic lives, [10]. The surface water temperature undergoes relatively small fluctuations, there was a fairly consistent thermal regime of about 25.7^{0}C and the pH range was between 6.8 and 7.7. This range fell within the recommended range that supports aquatic life including fishes [4].

Taking the size of the reservoir into consideration, there is the need to evolve strategies for effective utilization and management of the reservoir for optimum fish production. These strategies among others may include introduction of other culturable freshwater fish species into the reservoir. However, further assessment of the fish stock may be carried out to further determine any species that may have not been discovered during this study.

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