The identity of *Schilbe intermedius* (Ruppell, 1832) in Jebba Lake, Nigeria

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Abstract

The identity of *Schilbe intermedius* (Family: Schilbeidae) in Jebba Lake, Nigeria using quantitative (morphometric and meristic) and qualitative (colour and shape) parameters that makes identification easier was studied. 100 specimens were collected from the lake and used for the study. There was relationship between body weight and length of the fish (a=0.039, b=2.332, r=5.96). There was no significant difference (p>0.005) in the body proportions measured. The species found in the lake has neither adipose fin nor rudimentary.

Keywords: Morphometric, meristic, identity, butterfish, parameters, *Schilbe intermedius*, Jebba Lake, Nigeria

Introduction

Rationale and scientific management of fish according to Ribbink (1991) depends on the fundamental understanding of fish biology and ecology. Taxonomic studies have been going on right from the inception of the century because of its great contribution to management of fishery resources be it in freshwater, brackishwater or marine. Fish identification from any geographical region be it lake, river, floodplain etc is the first step for its proper utilization. Cailliet *et al*. (1986) reported that a good character is any attribute of an organism that can be detected and used to describe that particular organism. Over 10,000 fish species according to Lundberg *et al*. (2000) live in freshwater, which makes up about 40% of global fish diversity.

Stianssny (2002) reported taxa of some well-studied fish species. However, up to date, no comprehensive global analysis from freshwater when compared to those from the terrestrial system (Myers *et al*., 2000; Olson *et al*., 2001). Some of this fish

species are either not been identified at all, not been properly identified or their names have changed. Authors that include Omoniyi (1997), Njoku and Keke (2002), Paugy *et al*. (2003) reported morphometric parameters of *Tilapia zillii, Hydrocynus* spp., *Tilapia* spp., and *Citharinus latus* amongst others. Roberts (2003) reported that numerous fish stocks and species have declined both in abundance and composition. While some have gone extinct, others are threatened and at the verge of disappearing. The lake harbours the family Schilbeidae that is common and abundant, which play an important role in the commercial fishery of the lake. This study, therefore, attempts for the first time to ascertain the identity of *Schilbe intermedius* (formerly *Schilbe mystus*) in the lake through analysis of morphometric and meristic features and other peculiar characteristics that makes field identification easy.

Study area
Jebba Lake was created after the damming of River Niger in 1983 about 100km below Kainji at Jebba for electricity generation. It is located in the north-western part of Nigeria, situated between latitudes $9^0 35'$ N and $9^0 50^0$ N and longitudes $4^0 30'$ E and 5^0 00'E. It has an estimated surface area of 303km^2, which is about 35000ha and volume of 3.31x109m^3, about 100km long and about 12km at its widest point. The maximum depth is 105m while the mean depth is about 11 meters. The lake gets the major bulk of its water supply from the discharge of Lake Kainji while tributaries like Rivers Eku, Awun and others also discharge into the lake (Ita *et al*., 1983).

Materials and Method
Sample collection
100 specimens were collected from gill nets catches of artisanal fishermen for 3 months. Specimen were identified tentatively and transported in ice - chest box to the laboratory for analysis. Care was taken not to damage the fins and other appendages. Specimens were preserved in 5% formalin after analysis for future reference.

Body measurements
Morphometric characters were measured (to the nearest centimeters), taken from the left side of each specimen using dial calipers (Mitutoyo Corporation), meter rule, measuring board and weigh balance. Meristic characters were also evaluated according to Gunther (1966), which includes fin ray counts on dorsal, anal and pectoral, number of gill rakers on the lower region of the gills.
Qualitative characters, which include the shape and colour of each specimen, were also considered for the validation.

Validation of the specimen was done by comparing the values of body proportions and meristic counts obtained with standard keys -: De Vos (1995) and Paugy *et al*. (2003)

Analysis of variance was used to test for significant difference in the morphometric parameters measured.

Results and Discussion

Table 1 shows the body measurements of *Schilbe intermedius* used for the study. Standard and total lengths range between 11.00cm-14.00cm with mean 11.92±0.78 and 14.00cm-17.00cm with mean 15.3±0.96 respectively, while the weights range from 10.00g-30.00g with mean 22.89±4.90. There was no significant difference (p>0.05) in the lengths and weight of the species. Linear regression shows that there is relationship between body weight and length of fish (a=0.0387,b=2.3315, r=5.955).

Table 2 shows morphometric parameters measured. These include body depth, caudal peduncle length, length of dorsal base, gape width, jaw length, length of anal base, snout length, and head width amongst others. These parameter values did not show any significant difference. Authors such as Gunther (1966) and Leveque *et al*. (1990) did report morphometric parameters could be used to establish the identity of fish species.

Body proportions measured (Table 3) shows body depth (2.90-31.80%), caudal peduncle depth (5.00-13.60%), head length (14.20-21.70%), and length of pectoral fin (1.30-19.20%) as percentage of standard length. In the case of percentage head length as it relates to other parameters, head width is (40.00-71.40%), snout length (18.20-39.30%), length of pelvic fin (45.00-77.30%); percentage body depth to caudal peduncle length (31.40-53.80%) and percentage caudal peduncle length (50-108%) to caudal peduncle depth.

Meristic attributes (Table 3) shows that the dorsal region has, single spine, 1 - 2 soft fins and 4-6 soft rays. Similarly, Paugy *et al*. (2003) did report pectoral rays between 5-8 with a single spine. Idodo-Umeh (2003) reported *Schilbe intermedius* having 41-66 branched rays on anal fin, dorsal fin with spine and 5 branched rays, absence of adipose fin, causal fin forked and bends downward. Paugy *et al*. (2003) reported 41-66 anal fins where as 63-66 was reported in this study, which is within the range. De Vos (1995) did report that the number of anal fins varies with geographical origin of specimen. The lower part of the first branchial arc has 8-13 gill rakers (Table 3). Similar observation was also reported by Idodo-Umeh (2003).

The body colouration shows that the head, dorsal region and sides are blackish, which tends to become silvery or whitish down to the belly. There is also a prominent dark spot just after the operculum on both sides of the fish, absence of adipose fin or tissue, the snout is not prominent as in the case of *Schilbe mystus* and the caudal fin bends downward. The head and back according to Paugy *et al*. (2003) are dark brown with two brownish or blackish bands on the sides, one along the lateral line and another above anal fin base. As the species grows the colour pattern fades - the head and back remains brownish while the bands on the lateral line fades and the sides become more or less whitish or silvery. Idodo-Umeh (2003) reported the species having grayish - brown back, sides and belly silvery white and a large spot below the operculum.

Conclusion

The results show that most of the morphometric attributes of *Schilbe intermedius* is similar to previous description of other authors except for geographical influence on some attributes (adipose fin or its rudimentary) which makes it peculiar.

It can be said therefore that *Schilbe intermedius* is present in Jebba Lake based on morpho - meristic characteristic parameters analysis.

Table 1: Body measurements of *Schilbe intermedius* in Jebba Lake, Nigeria

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Parameters	*Minimum*	*Maximum*	*Mean ± SD*
Standard Length (cm)	11.00	14.00	11.92 ± 0.78
Total Length (cm)	14.00	17.00	15.30 ± 0.96
Weight (g)	10.00	30.00	22.89 ± 4.90

Table 2: Morphometric measurements of *Schilbe intermedius* in Jebba Lake, Nigeria

Parameters	**Range**	**Mean ± SD**
Body depth	1.4 - 2.6	3.24 ± 0.33
Caudal peduncle depth	1.0 - 1.3	1.11 ± 0.10
Caudal peduncle length	0.7 - 1.6	1.29 ± 0.19
Length of dorsal base	0.6 - 1.0	0.82 ± 0.10
Length of anal base	5.0 - 7.8	5.64 ± 0.60
Length of pectoral fin	1.0 - 2.3	1.64 ± 0.28
Length of pelvic fin	0.9 - 1.7	1.26 ± 0.20
Gape width	0.9 - 1.9	1.13 ± 0.21
Jaw length	0.4 - 0.6	0.51 ± 0.07
Head width	0.9 - 2.0	1.16 ± 0.23
Snout length	0.4 - 1.1	0.62 ± 0.12
Length of longest dorsal spine	1.2 - 2.4	1.77 ± 0.25
Head length	1.7 - 2.8	2.20 ± 0.21

Table 3: Morphomeristic parameters of *Schilbe intermedius* in Jebba Lake, Nigeria

Parameters	Range	Mean ± SD
Morphometric		
I. **Percentage of Standard Length**		
Body Depth	2.9-31.8	26.19± 5.32
Caudal peduncle length	5.0-13.6	10.86 ±1.65
Length of pectoral fin	1.3-19.2	13.56 ± 3.01
Length of pelvic fin	8.2 -15.5	10.54±1.67
Length of longest dorsal spine		14.84±2.05
Head length	10.4-20.9	18.46±1.46
	14.2-21.7	
II. **Percentage of Head Length**		
Head width	40.0-71.4	52.54±7.56
Snout length		28.45±4.51
Length of dorsal base	18.2-39.3	
Length of pectoral fin		37.60±5.44
Length of pelvic fin	28.6-52.9	73.26±10.62
III. **Percentage Body Depth**		57.32± 8.34
Caudal peduncle length	47.6-100	
IV. **Percentage Caudal Peduncle Length**		40.82±5.84
	45.0-77.30	
	31.4-53.8	
Caudal peduncle depth	50-108	80.04±12.41
Meristic		
Dorsal soft fin	1 - 2	-
Dorsal soft rays	4 - 6	-
Anal soft rays	63 - 66	-
Pectoral rays	5 - 8	-
Total pectoral spine	1	-
Lower gill rakers	8 - 13	-
Colour	Head, dorsal region and sides blackish, silvery or whitish down the belly	

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