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Studies on Fish Diversity and Condition Factor of Fish Species of Ogbei Stream, Southern Nigeria

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Abstract: The present study which is aimed at studying the condition factor of fish species of Ogbei Stream was carried out for a period of six months (January – June 2005). Eight (8) species belonging to seven (7) families and four (4) orders were identified from a total of 44 individuals. The family Cichlidae was more abundant and more diversified having three (3) species namely *Tilapia zilli, Oreochromis niloticus* and *Parachana obscura*. Other families had one (1) species of fish each. *Tilapia zilli* had the highest percentage composition (34.01%) followed by *Clarias anguillaris* (25.00%). *Parachana obscura, Labeo senegalensis* and *Erpetoichythes calabaricus* had equal percentage composition of   02.27%. Five (5, 62.5%) of the fish species had condition factor greater than 1.0 while three (3, 37.5%) had condition factor value that approximately ranged from 0.1 to 1.0. Thus the fishes especially *Malapterurus electricus* are doing well. It is envisaged that this study will serve as a baseline for future work and rational management of fishery resources of Ogbei Stream.
Key words: Diversity, condition factor, fish species, Ogbei Stream.

INTRODUCTION

Fish is among the main groups of animals inhabiting aquatic environments. It is highly cherished by man because of its availability and palatability. It is nutritionally richer than meat in protein content with a high amino acid profile, essential minerals and low in saturated fatty acids, and can be produced more cheaply than animal protein (Jhingram, 1987). It is a rich source of amino acids, vitamins, minerals and poly-unsaturated fatty acids (Davies *et al.,* 2015). It has low fat content. It is rich in calcium and phosphorus (Umunnakwe and Aharanwa, 2014).

Fish inhabits aquatic environments be it marine, esturarine or freshwater. In Nigeria, fishes inhabit different freshwaters such as lakes, rivers and streams. Apart from being a cheap source of highly nutritive protein and other essential nutrients required by the body (Sikoki and Otobotekere, 1999; Abowei, 2009) fish provides job opportunities to the teeming populace as well as raw materials for industrial and recreational uses.

Studies on inland fishery resources of Nigeria by Ita (1993) revealed that 268 different species in 34 well known Nigerian freshwater constitute about 12% Nigeria's total surface area of about 98,185,000 hectares. Fisheries resources in Nigeria are on the decline, as a result of inadequate management and over exploitation (UN, 2002; Ojelade et al., 2016). Fish yield of Nigeria inland waters is declining due to environmental degradation and inadequate management of the fisheries resources (Jamu and Ayinla, 2003). An estimated total of about 230 fish species have been recorded from the rivers in Nigeria (Ita, 1993). Thus Odo et al., (2009) reported 17 fish families composed of 52 species from Anambra River; Ogamba et al., (2013) reported 13 families composed of 34 species from Odi River and Meye (2013) reported 20 families compsed of 37 species from River Orogodo. Species richness and

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relative abundance have been recommended as ecological risk assessment in aquatic ecosystem (EPA, 1994).

Condition factor is an important fishery management tool. The relative robustness or degree of well-being of a fish expressed as the coefficient of condition (condition factor) is an important tool for the study of fish biology, mainly when the species lies at the base of the higher food web (Diaz et al., 2000; Adaka and Ogueri, 2014). 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; Nazeef and Abubakar, 2013). In several studies condition factor have been documented in many inland waters in Nigeria. Such studies include Arawomo (1982; Oni et al., 1983; Nazeef and Abukakar, 2013).

It is envisaged that this study which is aimed at studying the condition factor of fish species in Ogbei Stream, will serve as a baseline for future work and rational management of its fishery resources.

MATERIALS AND METHODS

Description of the study area

Ogbei Stream is a perennial freshwater located in Nkpologwu, Aguata Local Government Area, Anambra State, Nigeria. It rises from Umezeagwu highlands, flows eastwards through Isioji village in Nkpologwu town (5o 58' and 6o 01'N and 7o 06' and 7o 08'E) and stretches through Akpo (in the south) before joining Otalu River to empty into Anambra River (Fig. 1) (Ibemenuga and Inyang, 2006).
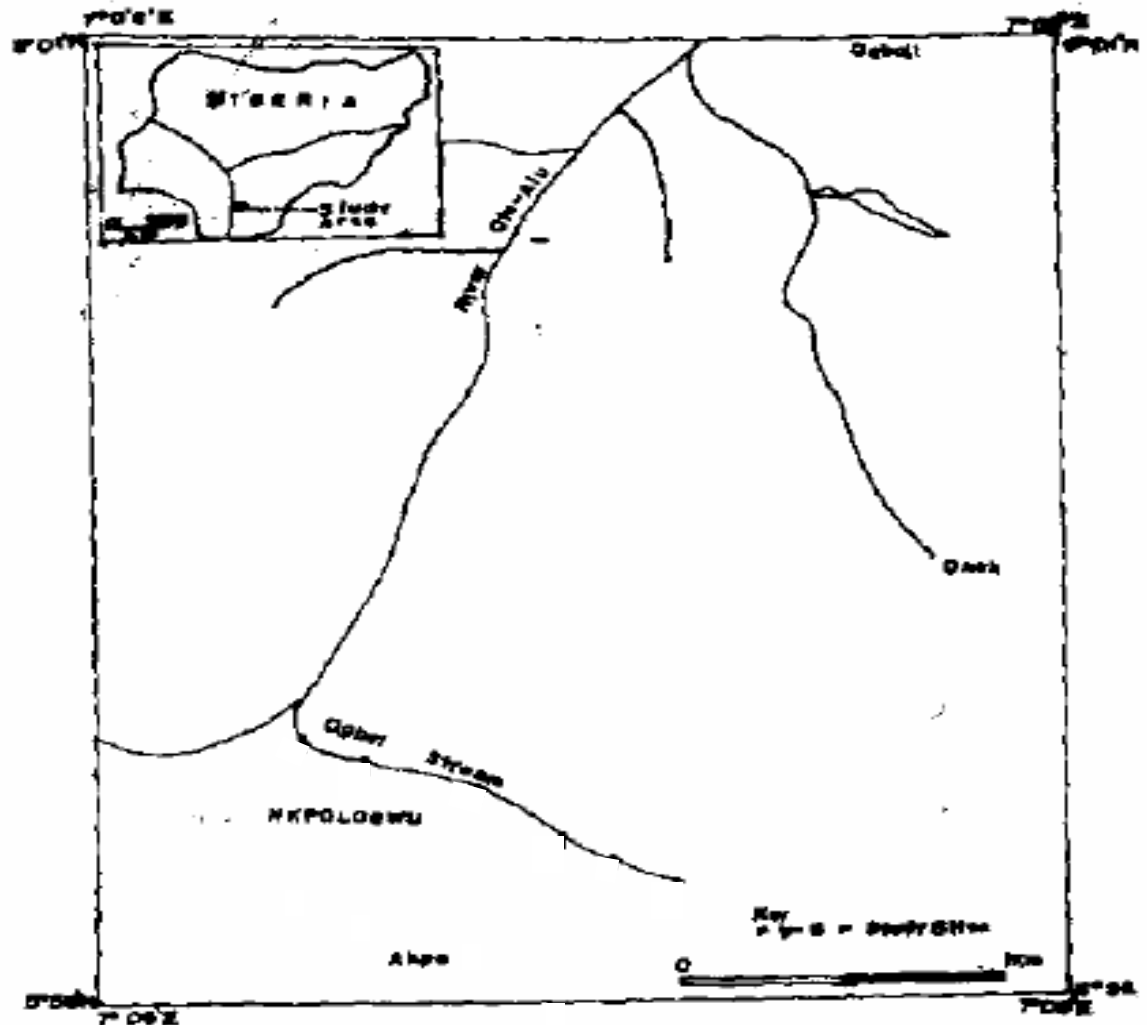
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Fig. 1: Map of the study area

Sampling and identification of fish samples

Fishing was carried out at forthnightly intervals using set nets, traps, hooks-and-lines from January – June 2005. Fish specimens caught were preserved in 10% formation in the field. They were then transported to the laboratory for identification. Keys of Holden and Reed (1972), Olaosebikan and Raji (1989) were used for identification of fishes.

Measurement of sampled fish and determination of condition factor

The sampled fishes were blot dried and weighed using weighing balance. The values obtained were recorded in grams. The full lengths were measured using measuring board and the values obtained were recorded in centimeters. Fulton's condition Factor (K) was calculated using the formula adopted from Bagenal (1978).

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$$K = \frac{100w}{1^3}$$

RESULTS

Fish species made up of 44 individuals collected from Ogbei Stream belong to 4 orders, 7 families and 8 species (Table 1). The family Cichlidae composed of three species namely Tilapia zilli, Oreochromis niloticus and Parachana obscura had the highest species abundance. The rest of the families had 1 species each.

Table 1: Fish species caught in Ogbei Stream

Order	Family	Species
Perciformes	Cichlidae	Tilapia zilli
		Oreochromis niloticus
	Channidae	Parachana obscura
Cypriniformes	Citharinidae	Labeo senegalensis
	Characidae	Hydrocynus vittatus
Siluriformes	Clariidae	Clarias anguillaris
	Malapteruridae	Malapterurus electricus
Polypteriformes	Polypteridae	Erpetoichythes calabaricus

The percentage composition of the fish species encountered in Ogbei Stream is presented in Table 2. Tilapia zilli had the highest percentage composition (34.01%). This was followed by Clarias anguillaris (25.00%). Parachana obscura, Labeo senegalensis and Erpetoichythes calabaricus had the least and equal percentage composition of 02.27%.

Table 2: Percentage composition of fish species caught in Ogbei Stream

Fish species	Total number caught	% of total
Tilapia zilli	15	34.01
Oreochromis niloticus	09	20.45
Parachana obscura	01	02.27
Labeo senegalensis	01	02.27
Hydrocynus vittatus	02	04.55
Clarias anguillaris	11	25.00
Malapterurus electricus	04	9.09
Erpetoichythes calabaricus	01	02.27

Table 3 shows the various fish species caught from Ogbei Stream, their length-weight relationships and condition factor. Five fish species (5, 62.5%) namely Oreochromis niloticus, Parachana obscura, Hydrocynus vittatus, Malaterurus elctricus and Erpetoichythes calabaricus out of eight species collected had length-weight (condition factor) values above 1.00. Among these fish species Malapterurus electricus had maximum condition factor value of 2.05 followed by Oreochromis niloticus (1.64) (Table 4). Hydrocynus vittatus had the least value of 1.34. The remaining three fish species namely Clarias anguillaris, Erpetoichythes calabaricus and Labeo senegalensis had condition factor values that approximately ranged from 0.1 to 1.0.

Table 3: Length-weight relationship and condition factor (k) of fish species caught in Ogbei Stream.

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Order	Family	Species	Length	Weight	Condition factor
Perciformes	Cichlidae	Tilapia zilli	30.00	245.00	0.91
		Oreochromis niloticus	13.00	45.00	1.64
	Channidae	Parachana obscura	24.20	215.35	1.52
Cypriniformes	Citharinidae	Labeo senegalensis	14.00	20.00	0.73
	Characidae	Hydrocynus vittatus	16.00	55.00	1.34
Siluriformes	Clariidae	Clarias anguillaris	18.05	59346.17	1.00
	Malapteruridae	Malapterurus electricus	55.2	346.17	2.05
Polypteriformes	Polypteridae	Erpetoichythes calabaricus	16.00	66.38	1.62
Total				1831.9	10.81

Table 4: Percentage condition factor of fish species caught in Ogbei Stream

Fish species	Condition factor (K)	% of total
Tilapia zilli	0.91	8.42
Oreochromis niloticus	1.64	15.17
Parachana obscura	1.52	14.06
Labeo senegalensis	0.73	6.75
Hydrocynus vittatus	1.34	12.40
Clarias anguillaris	1.00	9.25
Malapterurus electricus	2.05	18.96
Expetoichythes calabaricus	1.62	14.99
Total	10.81	100

DISCUSSION

The 8 species and 7 families recorded in this study compares favourably with fish composition on some southern Nigerian waters. For instance Oguzie (1982) recorded 7 families in Gubi: Reservoir, Udoidiong (1991) reported 10 families made up of 17 species in Udo Stream, Annune and Bako (1998) reported 4 families composed of 9 species in Kubani Reservoir in Zaria and Sikoki et al., (2008) obtained 11 families composed of 17 species in Onu-Iyi-Ukwu Stream.

In fish, the condition factor (K) reflects, through its variations, information on the physiological state of the fish in relation to its welfare (Abowei et al., 2009). The present study revealed that 62.5% (5 out of 8 fish species) of the fish species had K values greater than 1.00. This simply implies that the fishes are doing well in Ogbei Stream. Nazeef and Abukakar (2013) reported that K-factor should be equal to 1, while <1 and >1 indicate below and average conditions respectively. Condition factor greater or equal to one is good (Wade, 1985; Nazeef and Abubakai, 2013). Certain factors affect the well-being of a fish (Gayanilo and Pauly, 1997). These include data pulling, sorting into classes, sex, stages or maturity and state of the stomach. Condition factor is not constant for a species or population over a time interval and might be influenced by both biotic and abiotic factors such as feeding regime and state of gonadal development (Saliu, 2001; Ikongbeh et al., 2012).

CONCLUSION

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Conclusively, fish in Ogbei Stream is diverse. The fishes especially Malapterurus electricus are doing well in the stream. The approximately greater or equal to one condition factor recorded in this stidy indicates that Ogbei Stream is a productive and stable ecosystem.

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