IRASS Journal of Arts, Humanities and Social Sciences
https://irasspublisher.com/journal-details/IJAHSS
ISSN *(Online) 3049-0170*

Ichthyofauna dynamics of Omi- Nla River, Agbabu, Odigbo Local Government Area, Ondo State, Nigeria

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Article History

Received: 06 / 09 / 2025

Accepted: 22/ 09 / 2025

Published: 26 / 09 /2025

Abstract: The rate of overexploitation, pollution, habitat destruction, climate change, invasive species, and disease outbreaks in inland waters pose significant threats to biodiversity, underscoring the need for comprehensive research on freshwater ecosystems. Monitoring the diversity, abundance and richness of species in these ecosystems is crucial for assessing their status and stability. This research aimed to develop a comprehensive catalogue of fish species in Omi-Nla River, Agbabu. The catalogue will provide a vital baseline for conservation and management efforts, promoting the long-term sustainability of the river's ecosystem. This research was carried out in Omi-Nla River, for eight months from January,2025 to August 2025, in three fishing communities (station 1, Station 2, and station 3) based on their level of fishing activity. Data were collected through experimental field record of fish species across three landing sites with each site sampled on monthly basis with minimum of three canoes assessed in each location for their catches. The catches were sorted and identified into species using standard fish identification keys. Results revealed that total of 4,143 individuals were identified across (11) families, the Cyprinidae family has the highest species richness comprises of (11) species and Polyteridae family were the least diverse. *Clarias anguilaris* species was the most prevalent accounting for 7.57% of the total population with 241 individuals while, the least abundant species were *Chrysicthys walker* (1.04%). The highest Dominance (D) was recorded for Midstream station (1248) least was recorded for Upstream station (1048) Shannon (H) recorded the highest for Downstream (3.39) while the least was recorded for Upstream (3.32), evenness (E) recorded the highest for Downstream (10.76) and the least for the Upstream (0.71) Margalef (F) recorded the highest for Upstream (5.46) and the least for Midstream (5.33).This study provides foundational data sources that could be used by relevant agencies for conservation and management of fisheries resources of Omi-Nla River, Agbabu.

Keywords: Agbabu, Dynamics, Fish and Omi-Nla River.

How to Cite in APA format: Olaniyan, R. F. & Abubakar, A. M. (2025). *Ichthyofauna dynamics* of Omi- Nla River, Agbabu, Odigbo Local Government Area, Ondo State, Nigeria. *IRASS Journal of Arts, Humanities and Social Sciences, 2(9),118-126.*

Introduction

Freshwater bodies are habitats for diverse arrays of organisms ranging from plankton, nekton other aquatic organisms. These water bodies are often used for the disposal of industrial and anthropogenic effluents on the wrong assumption that aquatic ecosystems have self-purifying ability (Fakayode, 2005; Adeogun *et al*., 2011). The explosion in population density, urbanization and industrialization have had profound impact on human life and aquatic environment in terms of quantity and quality (Herschy, 1999). The increased demand for water as a consequence of population growth, agricultural and industrial development had been accompanied by research oriented towards the definition of criteria and guide for water quality W.H.O, 1966.

Fish is a major and affordable source of animal protein to about 4.3 billion people, giving up to 15% of their animal protein and essential nutrients for growth and maternal health. The sector contributed about $24 billion, which is 1.26% of the Gross Domestic Product (GDP) of all African countries in 2011 (de Graaf and Garibaldi, 2014). Fisheries is one of the most reliable sub sectors of agriculture that contribute significantly to the nation's GDP through agriculture (Federal Department of Fisheries - FDF, 2007). The significance of fisheries in a country extends beyond its economic contribution to GDP. Fisheries resources and products play a vital role in providing food, employment and income, while also influencing the country's culture, traditions and way of life (Adeosun, 2012). Fish, apart from being a very affordable source of protein necessary for human nutrition, also serves an important role in the development of a nation (FAO, 2020). It is a very good source of other essential nutrients required by the body. The medicinal purposes served by fish cannot be overemphasized due to its ability to replenish the human body with vitamins A and D; calcium, phosphorus and lysine; Sulphur and amino acids (Adeosun, 2019). Hence, studies about fish abundance and distribution are important in order to improve fishery management and conservation (Adeosun, 2019). The freshwater ecosystem, despite its remarkable biodiversity and diverse array of plant and animal species, is facing an alarming threat in the loss of its fish population. This is a pressing concern, as the decline in species richness in freshwater ecosystems far exceeds that of most terrestrial ecosystems, highlighting the urgent need for conservation efforts (Adesulu *et al.*, 2002). The purpose of this study is to assess the diversity and abundance of fish fauna at Omi-Nla River, Agbabu. The results obtained will contribute to existing knowledge on the state of the fish fauna in the River.

Materials and Methods

Study Area

This research was conducted in a stretch of Omi-Nla River, located in Odigbo Local Government Area **(ODLG)** Ondo State. Agbabu lies on the coordinates 6o 35'0" North, 4o 50'0" East. In terms of fisheries development, there is no stocking of the river; hence, the fish in the river are naturally occurring. The river is laced with farming activities. (Fig.1.1 and 1.2).

Vegetation

The vegetation of the research area is mangrove forest with small evergreen broad leaves trees. The trees are predominantly woody and stratified. It is made up of mostly giant trees; the tallest trees are emergent about 40m in height followed by the upper canopy about 20m. Common mangrove trees include *Avicennia* (White mangrove), *Rhizophora* (Red mangrove), and *Pandanus* (Screw pine) (Babatunde, 2010).

Most of the animals found in the research area include Polychaete worms, oysters, mussels, barnacles, prawns, shrimps and mudskippers are some of the animals found on the roots of mangrove trees, burrowing animals like clams, fiddler crabs and bristle worms are common in the muddy substratum. Animals associated with the parts of the mangrove trees above water include various insects, snakes and aquatic birds like the kingfisher, sandpipers, black tern and skimmer. Other aquatic birds include waders, duck and herons (Babatunde, 2010).

Fig: 1.1 *Map of Ondo State showing study area (Agbabu)*

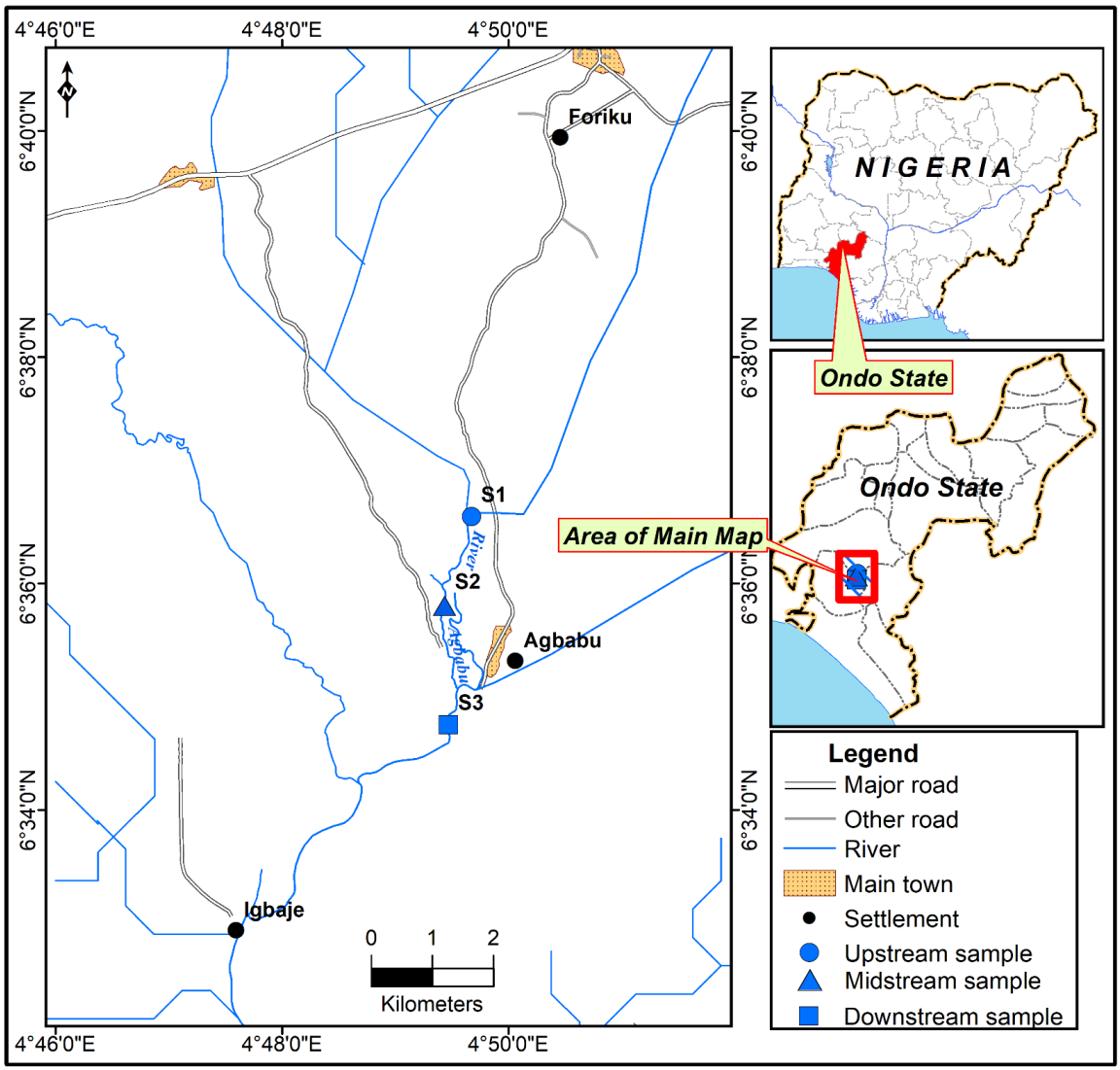

Fig: 1.2 *Map of the Sampling Points*

Sampling Stations

Three sampling stations (1-3) were chosen on the Omi-Nla River, Agbabu, the distance between the stations was 500-1500m and they were selected based on the human activities in the area.

- **Station 1** at Upstream had fewer human activities. There were farming activities involving oil palm trees *(Elaeis guineensis)* plantations and planting of cassava crops in the area.
- **Station 2:** Midstream which was about 500 m from Station 1. The major activities in this area were the Fishing activities and baskets-making.
- **Station 3:** Downstream which was about 500 m from Station 2 The major activities in this area are predominantly fish farming, as well as subsistence farming.

Results

Fish Composition

A total of 4,143 individuals were identified, distributed across eleven families. The Cyprinidae family exhibited the highest species richness, comprising eleven species, followed by Cichlidae with eight species and Clariidae with seven species. In contrast, the families Bagridae, Channidae, Characidae, Hepsetidae, and Polyteridae were the least diverse, each represented by two species. Checklist of the fish species identified in Omi-Nla River in OLGA is presented in Table 1.

The temporal variations in fish species during the research period, the highest percentage (19.49%) was recorded in March,2025 at the upstream station while the least fish species was recorded (5.73 %) in July,2025 Table 2.

The spatial variations in fish species in Omi-Nla River during the study period recorded the highest percentage composition (20.82 %) at upstream station in March,2025 while, the least as recorded (4.39 %) in August,2025 Table 3.

The highest percentage composition was recorded (19.55 %) in March,2025 for midstream station while the least percentage was recorded (4.64 %) for August,2025 Table 4.

The highest percentage composition of fish species was recorded (19.54 %) for Downstream station in Febuary,2025 while, the least fish species was recorded (5.41%) for August,2025 Table 5.

Relative Abundance and composition

Among the species, *Clarias anguillaris* was the most prevalent, accounting for 7.57% of the total population with 241 individuals. This was followed closely by *H. longifilis*, which had 233 individuals (7.31 %), and *Barbus ablabes* with 230 individuals

(7.22 %). Meanwhile, the least abundant species were *Chrysicthys walker* (1.04 %), followed by *Chrysicthys auratus* (1.10 %) and *Polyterus ansorgel* (1.13 %) Table 6.

The seasonal distribution of Fish species

The highest number of fish species were recorded in the dry season while the least number were recorded in the rainy season Figure 1.3

Spatial Diversity of fish species

The spatial variation in the diversity of fish fauna across the sampled stations (Upstream, Midstream and Downstream) is presented in Table 7. Number of taxa (39) was recorded in the three stations. The highest value for Simpson, Shannon-Wiener (H) and evenness indices were recorded in the downstream, While the least values were obtained in the upstream. The highest value for Margalef index was obtained in the upstream while the least value was recorded in midstream Table7.

Table 1.

Checklist of Fish fauna recorded from Omi-Nla River from January, 2025 to August, 2025

Bagridae

Chrysicthys walker

Chrysicthys auratus

Channidae

Parachanna obscura

Parachanna Africana

Characidae

Alestes brevis

Alestes imberi

Cichlidae

Tilapia guineensis

Tilapia mariae

Sarotherodon galilacus

S. .melanotheron

Coptodon guineensis

Oreochromis aureus

O.niloticus

Clariidae

Clarias anguillaris

C. gariepinus

Heterbranchus bidos.

H.isopterus

H. longifilis

Cyprinidae

Barbus ablabes

Barbus aboinensis

Barbus batesi

Barbus lagoensis

Labeo senegalensis

Distichodontidae

Distichodus brevipinnis

Distichodus rostratus

Distichodus engycephalus

Nannocharax ansorgii

N.latifsciatus

Hepsetidae

Hepsetidae odoe

Malapterurus electricus

Mormyridae

Mormyrus rume

Mormyrus hasselquistil

Mormyrus macropthalmus

Mochokidae

Mochocus brevis

Mochocus niloticus

Osteoglossidae

Heterotis niloticus

Polyteridae

Polyterus ansorgel

*Polyterus bichirlaprad****Table 2.***

Abundance and Composition of Fish Fauna in Omi-Nla River from January, 2025 to August, 2025

Species	**Family**	**Jan, 2025**	**Feb, 2025**	**Mar, 2025**	**Apr, 2025**	**May 2025**	**Jun, 2025**	**Jul, 2025**	**Aug, 2025**	**Total**	**Percentage**
Chrysicthys walker	**Bagridae**	8	6	7	6	2	1	3	3	36	1.02
Chrysicthys auratus		10	6	4	7	3	4	0	4	38	1.08
Parachanna obscura	**Channidae**	8	6	9	5	0	3	1	1	33	0.94
Parachanna Africana		9	10	4	6	3	0	1	0	33	0.94
Alestes brevis	**Charactidae**	10	9	11	0	3	7	0	3	43	1.22
Alestes imberi		12	7	9	6	4	0	1	0	39	1.11
Tilapia guineensis	**Cichlidae**	11	8	7	2	3	2	1	1	35	0.99
Tilapia mariae		13	8	7	3	0	5	0	3	39	1.11
Sarotherodon galilacus		10	9	6	8	0	0	2	0	35	0.99
S. .melanotheron		10	4	10	6	5	0	2	4	41	1.17
Coptodon guineensis		10	10	12	8	0	1	1	6	48	1.37
Oreochromis aureus		14	18	6	12	3	8	5	0	66	1.88
O.niloticus		11	13	7	12	3	6	5	0	57	1.62
Clarias anguillaris	Clariidae	8	22	23	24	6	3	5	4	95	2.71
C. gariepinus		34	41	50	54	30	10	18	7	244	6.96
Heterbranchus bidos.		46	52	56	48	11	16	8	1	238	6.79
H.isopterus		54	44	52	55	10	15	7	0	237	6.76
H. longifilis		59	54	51	48	9	10	0	9	240	6.85
Barbus ablabes	**Cyprinidae**	13	52	45	42	9	9	10	6	186	5.36
Barbus aboinensis		18	24	24	27	36	18	14	13	174	4.96
Barbus batesi		21	23	16	27	8	16	13	4	128	3.65
Barbus lagoensis		46	26	45	36	20	10	18	8	209	5.96
Labeo senegalensis		45	46	48	52	20	16	10	6	243	6.93
Distichodus brevipinnis	**Distichodontidae**	18	18	22	24	5	8	12	6	113	3.22
Distichodus rostratus		21	16	21	18	7	9	7	8	107	3.05
Distichodus engycephalus		17	18	16	15	8	9	7	12	102	2.91
Nannocharax ansorgii		14	11	12	15	6	13	9	8	88	2.51
N.latifsciatus		17	20	12	10	9	6	8	9	91	2.59
Hepsetidae odoe	**Hepsetidae**	9	12	12	18	3	9	9	7	79	2.25
Malapterurus electricus		12	11	9	12	12	8	9	8	81	2.31
Mormyrus rume	**Mormyridae**	8	4	8	15	4	0	0	5	44	1.25
Mormyrus hasselquistil		12	9	10	4	10	0	1	2	48	1.37
Mormyrus macropthalmus		9	6	9	3	0	2	3	0	32	0.91
Mochocus brevis	**Mochokidae**	9	15	9	6	7	0	1	1	48	1.37
Mochocus niloticus		5	10	12	11	3	3	8	0	52	1.48
Osteoglossidae		4	6	12	0	0	1	0	2	25	0.71
Heterotis niloticus		9	6	7	0	0	0	1	3	26	0.74
Polypterus ansorgel	**Polypteridae**	4	4	3	0	0	1	1	0	13	0.37
Polypterus bichirlapradei		5	3	0	1	0	4	0	4	17	0.48
TOTAL/Percentage		**653**	**667**	**683**	**646**	**262**	**233**	**201**	**158**	**3503**	**100%**
Percentage Composition		**18.64**	**19.04**	**19.49**	**18.44**	**7.47**	**6.65**	**5.73**	**4.51**	**100%**	

Table 5.
Fish species recorded for Downstream in Omi-Nla River from January, 2025 to August, 2025

	Jan,25	Feb,2025	Mar,25	Apr.2025	May,25	Jun,25	Jul,25	Aug,25	Total	Percentage
Chrysicthys walker	3	3	2	2	0	1	1	1	13	1.06
Chrysicthys auratus	4	2	1	3	1	2	0	1	14	1.14
Parachanna obscura	3	3	3	4	0	1	0	1	15	1.23
Parachanna Africana	4	4	1	2	1	0	1	0	13	1.06
Alestes brevis	4	3	4	0	1	2	0	1	15	1.23
Alestes imberi	4	3	3	2	2	0	0	0	14	1.14
Tilapia guineensis	4	4	2	1	1	2	0	1	15	1.23
Tilapia mariae	5	2	3	1	0	2	0	1	14	1.14
Sarotherodon galilacus	4	3	2	3	0	0	1	0	13	1.06
S. .melanotheron	5	2	3	2	1	0	0	2	15	1.23
Coptodon guineensis	4	5	4	2	0	0	1	2	18	1.47
Oreochromis aureus	5	6	2	4	1	3	2	0	23	1.88
O.niloticus	4	5	2	4	1	2	3	0	21	1.72
Clarias anguillaris	4	7	8	8	2	1	2	1	33	2.70
C. gariepinus	12	14	16	18	7	3	6	2	78	6.40
Heterbranchus bidos.	15	18	18	18	4	6	3	2	84	6.89
H.isopterus	18	16	18	15	4	5	3	0	79	6.48
H. longifilis	20	18	17	16	3	3	0	3	80	6.56
Barbus ablabes	6	18	14	12	3	3	2	3	61	5.00
Barbus aboinensis	6	8	8	9	12	6	5	4	58	4.76
Barbus batesi	8	7	6	9	4	5	5	4	48	3.94
Barbus lagoensis	16	12	15	12	8	3	6	4	76	6.23
Labeo senegalensis	15	15	16	14	8	8	3	2	81	6.65
Distichodus brevipinnis	8	8	7	8	1	4	6	3	45	3.69
Distichodus rostratus	6	5	7	6	4	3	2	4	37	3.03
Distichodus engycephalus	4	6	4	5	4	5	2	4	34	2.79
Nannocharax ansorgii	4	4	4	5	2	4	3	4	30	2.46
N.latifsciatus	6	6	4	4	4	2	3	3	32	1.88
Hepsetidae odoe	3	4	4	6	1	3	3	3	27	2.21
Malapterurus electricus	3	4	2	3	4	2	3	2	23	1.88
Mormyrus rume	3	2	2	5	1	0	0	2	15	1.23
Mormyrus hasselquistil	5	3	3	1	3	0	0	2	17	1.39
Mormyrus macropthalmus	4	2	3	1	0	0	1	0	11	0.90
Mochocus brevis	3	5	2	2	2	0	0	1	15	1.23
Mochocus niloticus	2	4	4	3	1	1	5	0	20	1.64
Osteoglossidae	2	2	4	0	0	1	0	1	10	0.82
Heterotis niloticus	3	2	3	0	0	0	1	1	10	0.82
Polypterus ansorgel	1	2	1	0	0	0	1	0	5	0.41
Polypterus bichirlapradei	2	1	0	0	0	2	0	1	6	0.49
TOTAL	**232**	**238**	**222**	**210**	**91**	**85**	**74**	**66**	**1218**	**100**
Percentage Composition	**19.04%**	**19.54%**	**18.22%**	**17.24%**	**7.47%**	**6 .97%**	**6.07%**	**5.41%**		

Table 6:

Relative Abundance and Composition of Fish Fauna in Omi-Nla River, ODLG, Area.

S.No	Family	Species	Total	Percentage
1	Bagridae	*Chrysicthys walker*	33	1.04%
		Chrysicthys auratus	35	1.10%
2	Channidae	*Parachanna obscura*	40	1.26%
		Parachanna Africana	40	1.26%
3	Characidae	*Alestes brevis*	40	1.26%
		Alestes imberi	39	1.22%
4	Cichlidae	*Tilapia guineensis*	37	1.16%
		Tilapia mariae	41	1.29%
		Sarotherodon galilacus	38	1.19%
		S. melanotheron	47	1.47%
		Coptodon guineensis	51	1.60%
		Oreochromis aureus	40	1.26%
		O. niloticus	39	1.22%
5	Clariidae	*Clarias anguillaris*	77	2.42%
		C. gariepinus	118	3.70%
		Heterbranchus bidos	150	4.70%
		H. isopterus	195	6.12%
		H. longifilis	233	7.31%
		Clarias anguillaris	241	7.57%
		C. gariepinus	150	4.70%
6	Cyprinidae	*Barbus ablabes*	230	7.22%
		Barbus aboinensis	198	6.21%
		Barbus batesi	161	5.05%
		Barbus lagoensis	173	5.44%
		Labeo senegalensis	190	5.96%
		Distichodontidae	193	6.06%
		Distichodus brevipinnis	150	4.70%
		Distichodus rostratus	117	3.68%
		Distichodus engycephalus	98	3.08%
		Nannocharax ansorgii	92	2.89%
		N. latifsciatus	198	6.21%
7.	Hepsetidae	*Hepsetidae odoe*	85	2.67%
		Malapterurus electricus	95	2.98%
8.	Mormyridae	*Mormyrus rume*	67	2.10%
		Mormyrus hasselquistil	62	1.95%
		Mormyrus macropthalmus	67	2.10%
9.	Mochokidae	*Mochocus brevis*	40	1.26%
		Mochocus niloticus	51	1.60%
		Osteoglossidae	37	1.16%
		Heterotis niloticus	40	1.26%
10	Polypteridae	*Polypterus ansorgel*	36	1.13%
		Polypterus bichirlapradei	42	1.32%
Total	**10**	**43**	**4143**	**100%**

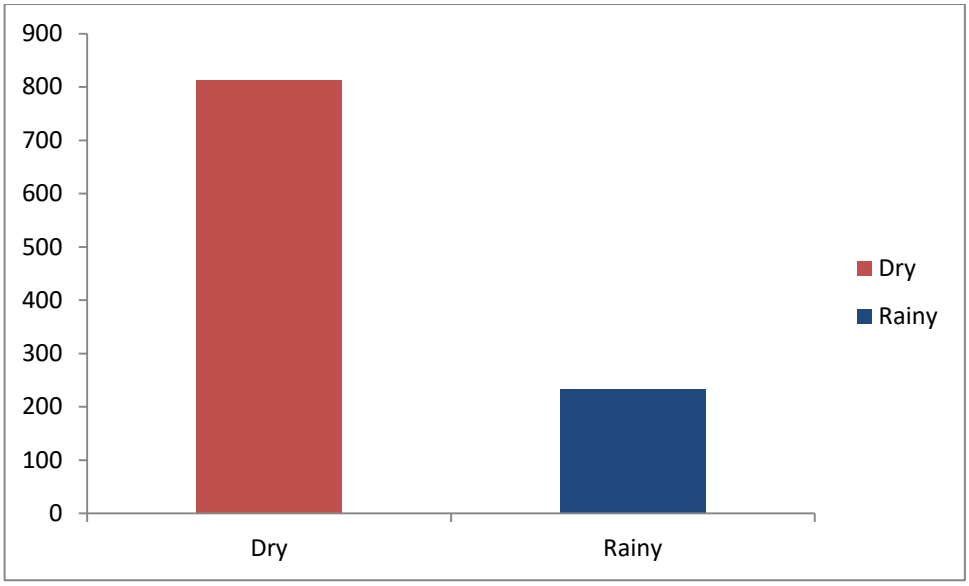

Figure 1. 3: *Seasonal Distribution of Fish Fauna in Omi-Nla River*

Table 7:

Spatial variation in the Diversity indices of Fish fauna across the three stations of Omi-Nla River, OLGA, Ondo State.

	Upstream	Midstream	Downstream
Taxa_S	39	39	39
Dominance_D	0.046	0.041	0.041
Individuals	1048	1248	1218
Simpson_1-D	0.954	0.958	0.959
Shannon_H	3.323	3.384	3.393
Evenness_e^H/S	0.712	0.757	0.763
Margalef	5.464	5.330	5.348

Discussion

A total of 4,143 individuals distributed across 11 families were identified and recorded in this research this finding is consistent with several studies conducted in tropical inland water bodies in Nigeria, including Olatunji (2022) on the Owena River, Omoike (2021) on the Asejire Reservoir, Akinyemi (1987) on Lake Eleyele and Lake Asejire, and Ogidiaka and Ikomi (2021) on the Forcados Estuary. The fish diversity recorded in this study is notably higher compared than other studies in various regions of Nigeria, such as Sani *et al*. (2019) on the Bodna River in Abuja, and Ayanwole *et al.* (2013), who reported a low diversity of only 11 species from five families in the lower Usuma Dam, Bwari, Abuja. Similarly, Banyigyi (2016) recorded 11 species belonging to six families in the Doma Reservoir, Nasarawa.

The higher abundance and diversity of fish fauna recorded in this research can be attributed to factors such as water depth and resource availability, which are known to influence fish distribution and abundance (Paterson and Whitfield, 2000). However, the family Cyprinidae was the most dominant in this research which is in contrast with findings from Olatunji (2022) and Sani *et al.* (2021), both of whom identified the Cichlidae family as dominant in their respective studies. The dominance of Cyprinidae may be linked to their adaptability, reproductive capacity, and diverse feeding habits.

Additionally, *Clarias anguillaris* emerged as the most abundant species in this study. This abundance can be attributed to its remarkable ability to survive in low-oxygen environments, facilitated by a modified swim bladder that allows for aerial respiration. This adaptation enables *C. anguillaris* to occupy stagnant waters where other fish species may struggle (Ahmad *et al.*, 2008).

Regarding seasonal variations in fish species distribution, this study observed a higher abundance during the dry season compared to the wet season. This observation aligns with findings from Offem *et al*. (2011), Falaye *et al*. (2015), and Banyigyi (2016), all of whom reported greater fish distribution and abundance during the dry season. The increased abundance during this time may be attributed to the preference of juvenile stages of many aquatic species for waters with reduced salinity (Ayoola and Kuton, 2017). This finding contrasts with the reports of Olatunji (2022), Sani *et al.* (2021), and Iorchor *et al*. (2007) who reported higher fish abundance in the wet season.

Conclusion and Recommendations

The findings from this research can inform impact assessments, as well as the planning and implementation of policies for monitoring fish populations and the sustainable development of Omi-Nla River, hence, continuous management by fish farmers is recommended. This research further encourages collaboration between governmental and non-governmental bodies in funding research on Omi-Nla River.

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