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Fish Species Composition from the Use of "Ita" Net in Escravos Estuary, Delta State, Nigeria

***Binyotubo, E.T.**

*Corresponding Author:
tonybinyo@gmail.com, wumibinyotubo@gmail.com, 08035828408, 09014002241

ABSTRACT

The use of Ita net for fishing and species composition from the catch in Escravos Estuary of Delta State was carried out from August, 2023 to January, 2024, using Ita net measuring 63mm, 87mm and 112mm mesh sizes respectively. Fish samples were collected from three sampling stations namely; Station 1 Okerenkoko, Station 2 Emegbene and Station 3 Kurutie. Fish species caught were sorted, counted and identified into families and species using fish identification guides and monographs. A total of 350 fishes were recorded with 28 fish species belonging to 9 families were identified. The dominant fish family was Carangidae family (28.86%) represented by 3 species (*Caranx hippos*, *Caranx crysos*, and *Caranx latus)* and the least dominant was Monodactylidae family (2.28%) represented by 1 species (*Pseltias sebae). Caranx hippos* (14.00%) was the most dominant fish species and *Arius heudeiot* (0.57%) the least dominant species. Station 1 (Okerenkoko) caught the highest (146) number of fish species, followed by Station 2 (Emegbene) with 120 species, and Station 3 (Kurutie) with the least (84) number. Ita net with 63mm mesh size (151) caught more species than 87 mm mesh size (114) and 112 mm mesh size (85). This study serves as a base line data which will assist relevant bodies in the management and conservation of fisheries resources in the Escravos Estuary around Okerenkoko and Kurutie. It is therefore recommended that proper monitoring and management of the fish stock should be carried out regularly for an improved and sustainable exploitation and management of fisheries resources of the Escravos Estuary.

Keywords:
Fishing gear, Ita net, Escravos Estuary, Delta State

Introduction

In the Niger Delta area of Nigeria, all the water bodies such as the creeks, lakes, rivers etc. are endowed with diversity of fish resources which has attracted many fishers into these water bodies in order to fend for food for themselves and their families which serve as a source of livelihood to them. In spite of these enormous fish resources in the Niger Delta area, the riverine fisheries in the area are generally disorganized, fragmented and characterized with indiscriminate fishing practices which are reducing the population of the fish resources. Indiscriminate use of fishing gears does not only reduce the fish stocks, but the excessive fishing pressure can also cause the collapse of fish populations and destabilization of the aquatic environment (Gislason *et al*., 2000, Hutchings 2000) by making many of the fishes to become vulnerable, endangered, or critically endangered (Dienye *et al*., 2018). Consequently, the study on the impacts of fishing on fish species composition and quantitative change of fish is targeted to manage fish resources in an effective and reasonable way by predicting and evaluating the change and state of fish resources. Fishery-dependent data collection is one of the most valuable tools available to fishery managers to determine the catch estimates for both targeted fish

species and any by-catch involved in the fishery, or of all fish species in a multi-species fishery. The catch estimates can be obtained in a variety of ways including the use of scientific observations, fisher's logbooks (Woll *et al.*, 2006, King, 2007, Dienye *et al*., 2018) and questionnaire surveys (Bergmann *et al.*, 2004, McLeod and Leslie 2009). Fisheries observer programs are used worldwide to collect fisheries data including biological data, species composition, discards, etc. For appropriate estimation of fish fauna, selection of fishing gear is important and directly influences species diversity and yield of the catch (Ju-Duk *et al*., 2015, Dienye *et al*., 2018). The fish resources are exploited with numerous and ingenious fishing gear. According to Kwen *et al*. (2013) cast net, lift net, gill net, spear, hand-line, long-line, fish fence and screens and traps are the most common fishing gear used in water bodies in the Niger Delta area. In the Escravos Estuary, the "Ita'' net is among the most effective and efficient fishing gear in terms of number and weight of fish caught. Stow net covers a large area per deployment, compared with lift net, cast net and stow net. A comprehensive study on the fish species composition of stow net fisheries is scanty in the Escravos Estuary around Okerenkoko and Kurutie axis of Delta State, Nigeria. This study is therefore carried out to investigate the fish species composition from using "Ita" net for fishing activities in Escravos Estuary so that proper management advisory can be formulated to maintain the resilience of the species and sustainable harvest of the fish resource.

Materials and Methods

Study Area

The study area is located in Escravos Estuary around Okerenkoko and Kurutie axis in Warri South-West Local Government Area of Delta State, Nigeria. The Escravos Estuary is situated between latitude $5^0\,30'\,0''$ N and $5^0 50'0''$N and Longitude $5^0 10'0''$E and $5^0\,40'0''$E (Figure 1). The area is characterized by active beaches on the seaward sides. The surrounding Escravos Estuary is characterized by a tropical climate with well demarcated rainy and dry seasons. The dry season stretches from November to April while the rainy season is usually from May to October (Opule, 2000). The vegetation is made of *Eichhornia crassepes, Fern, Pistia, Pennisetum Purpereum, Cenchrus, Celiaris, Nympkarasp, Trapasp, Lemnasp, Ceratrpphyllum sp.* The human activities that are carried out in the study area include: offloading and selling of goods and petroleum products, boat transportation, dumping of organic and inorganic wastes, log movement, laundry, boats, bathing and swimming.

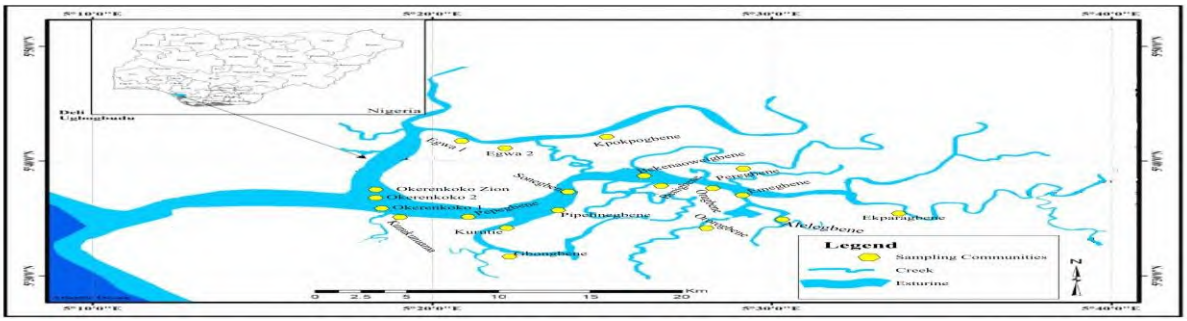

Fig. 1. Map of the Study Area, Showing Sampled Communities

Sampling Procedure

Three sampling stations along the main course of the Escravos Estuary were selected based on preliminary investigation from ita net fishers. For the study locations: namely Station 1 Okerenkoko, Station 2 Benigbene and Station 3 Kurutie. Fish samples were collected biweekly to avoid over fishing for six consecutive months from November, 2022 to April, 2023 from the three sampling stations with

the assistance of local artisanal fishers using different Ita nets measuring 70 m length, 25 m width and 63mm, 87mm and 112mm mesh sizes. The fish species caught were sorted, counted and identified into families and species using fish identification guides and fish monographs.

Results and Discussion

A total of 350 fishes were recorded with 28 fish species belonging 9 families were identified in the Escravos estuary around Okerenkoko and Kurutie axis (Table 1). The dominant fish family in the Escravos Estuary was Carangidae family (28.86%) represented by 3 species (*Caranx hippos*, *Caranx crysos*, and *Caranx latus)*, followed by Mugilidae family (23.14%) by 5 species (*Mugil bananasis*, *Mugil cephalus*, *Mugil curema*, *Liza dumerilli* and *Liza fatcipinnis)* and the Monodactylidae family (2.28%) was the least dominant fish family represented by 1 species (*Pseltias sebae)*. Based on the fish species caught, the most dominant species was *Caranx hippos* (49) which constituted 14.00% of the total catch followed by *Caranx crysos* (30) and *Mugil cephalus* (30) with 4.57% each while the least dominant species was *Arius heudeiot* (2) with 0.57%. The families and fish species caught in this study are similar to those caught around similar estuarine environment in other parts of the Niger Delta regions of Nigeria. This is because its environs is entirely brackish water. The number of fish species caught in the Escravos Estuary based on the stations is shown in Table 2 which indicated that Station 1 (Okerenkoko) caught a total number of 146 fish species which was the highest, followed by Station 2 (Benigbene) with 120 fish species, and Station 3 (Kurutie) with 84 fish species only. Both the fish families and fish species identified in this study were similar with those identified in the New Calabar River, Niger Delta, Nigeria by Dienye *et al.* (2018). However, the total number of fish species identified in this study was higher than those of Dienye *et al.* (2018). The likely reasons why this study had higher number of fish species than that of Dienye *et al.* (2018) and Olopade and Dienye (2018) might be due to the longer duration of sampling and selectivity of fishing gear used in this study than theirs. According to Olopade and Rufai (2014) the number of species could vary depending upon differences in the sampling methods and sampling effort, as well as fish abundance. The area of operation of a fishing gear, the inconsistent behaviour of the fish relative to the fishing gear, and the size of the fish determine the part of a stock that can be caught by a fishing gear.

Table 1: Fish Species Composition of Stow net in Escravos Estuary of Delta State

Family	**No.**	**%**	**Fish species identified**	**No**	**%**	**Common name**	**Local name**
Mugilidae	81	23.14	*Mugil bananasis*	21	6.00	Mullet	Itoko
			Mugil cephalus	30	8.57	Mullet	Itoko
			Mugil curema	16	4.57	Mullet	itoko
			Liza dumerilli	10	2.86	Mullet	Itoko
			Liza fatcipinnis	4	1.14	Mullet	Itoko
Carangidae	101	28.86	*Caranx crysos*	30	8.57	Crevalle jack	Koko fewei
			Caranx hippos	49	14.00	Crevalle jack	Koko fewei

			Caranxlatus	22	6.28	Crevalle jack	Koko fewei
Sphyraenigidae	42	12.00	*Sphyraen aafra*	4	1.14	Barracuda	Doro
			Sphyraena barracuda	7	2.00	Barracuda	Doro
			Sphyraena quachancho	11	3.14	Barracuda	Doro
			Sphyraena sphyraena	20	5.71	Barracuda	Doro
Lutjanidae	15	4.28	*Lutjanus agennes*	7	2.00	African red snapper	Tome
			Lutjanus dentatus	5	1.43	African brown snapper	Tome-iyore
			Lutjanu sendecacanthus	3	0.86	Guinea snapper	Tome
Drepanidae	11	3.14	*Catemoa fricana*	11	3.14	African sicklefish	Ogidae
Monodactylidae	8	2.28	*Pseltias sebae*	8	2.28		
Sparidae	50	14.28	*Diplodus carvinus*	12	3.43	Zebra seabream	Ekelor
			Diplodus puntazzo	19	5.43	Sharpsnout	
			Diplodus sargus	6	1.71	White seabream	
			Pageilus bagaravo	3	0.86		
			Pagrus pagrus	10	2.86		Ikekalor
Ariidae	25	7.14	*Arius gagus*	14	4.00	Sea catfish	Egbele
			Arius heudeiot	2	0.57	Smoothmouth catfish	Ngulor
			Arius latiscutatus	9	2.57	Rough head sea catfish	Ebaku
Scombridae	17	4.86	*Scomberus totor*	4	1.14	Mackerel	Mono
			Euthynnus alletteratus	5	1.43	Mackerel	Mono
			Katsuwonus palamis	8	2.28	Mackerel	Mono

Source: Field Survey, 2022.
Key: ST 1 = Station 1 Okerenkoko, ST 2 = Station 2 Benigbene and ST 3 = Station 3 Kurutie

Table 2: Fish Species Composition based on the stations in Escravos Estuary of Delta State

Fish species identified	**No**	**%**	**Station 1 Okerenkoko**	**Station 2 Benigbene**	**Station 3 Kurutie**
Mugil bananasis	21	6.00	13	6	2
Mugil cephalus	30	8.57	10	9	11
Mugil curema	16	4.57	5	8	3
Liza dumerilli	10	2.86	4	6	0
Liza fatcipinnis	4	1.14	0	4	0
Caranx crysos	30	8.57	11	12	7
Caranx hippos	49	14.00	24	19	6
Caranxlatus	22	6.28	10	8	4
Sphyraen aafra	4	1.14	3	0	1
Sphyraena barracuda	7	2.00	0	3	4
Sphyraena quachancho	11	3.14	4	5	2

Sphyraena sphyraena	20	5.71	15	0	5
Lutjanus agennes	7	2.00	1	0	6
Lutjanus dentatus	5	1.43	0	2	3
Lutjanu sendecacanthus	3	0.86	0	3	0
Catemoa fricana	11	3.14	5	4	2
Pseltias sebae	8	2.28	0	4	4
Diplodus carvinus	12	3.43	7	2	3
Diplodus puntazzo	19	5.43	11	0	8
Diplodus sargus	6	1.71	0	4	2
Pageilus bagaravo	3	0.86	0	0	3
Pagrus pagrus	10	2.86	4	4	2
Arius gagus	14	4.00	6	8	0
Arius heudeiot	2	0.57	2	0	0
Arius latiscutatus	9	2.57	1	7	1
Scomberus totor	4	1.14	0	0	4
Euthynnus alletteratus	5	1.43	3	2	0
Katsuwonus palamis	8	2.28	7	0	1
Total fish species caught			**146**	**120**	**84**

Table 3 shows fish species composition based on the different mesh sizes during the study period in Escravos Estuary of Delta State. The fish species caught decreased in number as the mesh size increased from 63mm to 112mm.. The ita net with 63mm mesh size (151) caught more fish species than the 87mm mesh size (114) and 112mm mesh size (85). The most vulnerable fish species to 63mm mesh size were *Caranx hippos* (28), *Caranx latus* (17) and *Mugil cephalus* (14) while the least vulnerable fish species to of 63mm mesh size were *Sphyraen aafra* (3), *Lutjanus dentatus* (2), *Lutjanus dentatus* (2) and *Pseltias sebae* (1). The most vulnerable fish species with 87mm mesh size were *Caranx crysos* (13), *Caranx hippos* (10) and *Arius gagus* (10) while *Liza dumerilli* (2) was the least caught fish species with the 87mm mesh size. For the 112mm mesh size, the most dominant fish species caught were *Caranx hippos* (11) and *Caranx crysos* (8) while the least dominant fish species were *Sphyraen aafra* (1), *Lutjanu sendecacanthus* (1), *Pseltias sebae* (1) and *Scomberus totor* (1). This is in disparity with the findings of Ibim *et al*. (2016) who caught a higher number of fish species in the New Calabar River. This could be probably due to the duration of sampling and selectivity of the fishing gear used in the present study. The number of fish species could vary depending upon differences in the sampling methods and sampling effort, as well as fish abundance (Olopade and Rufai 2014). The area of operation of a fishing gear, the inconsistent behaviour of the fish relative to the fishing gear, and the size of the fish determine the part of a stock that can be caught by a fishing gear. The difference in fish species number could also be due to other reasons such as seasonal changes (Soyinka and Kazeem, 2008), length of rivers (Allison and Kingdom, 2005), changes in the water quality (Obasohan and Oronsaye, 2006, Adana *et al.*, 2008) and part of water body fished (Nguyen *et al.*, 2008). Furthermore, fish species

may develop avoidance behaviour towards a fishing gear, which could also result to the capture of lower number of fish species (Dienye *et al.*, 2018). According to King (1991) most commercially and scientifically important fish species occurring in the Niger Delta waters can be landed all year round by artisanal fishers, however there are months when they are more abundant.

Table 3: Fish Species Composition based on the mesh sizes in Escravos Estuary of Delta State

Fish species identified	**No**	**2.5 inches**	**3.5 inches**	**4.5 inches**
Mugil bananasis	21	10	6	5
Mugil cephalus	30	14	9	7
Mugil curema	16	11	5	0
Liza dumerilli	10	6	2	2
Liza fatcipinnis	4	2	0	2
Caranx crysos	30	9	13	8
Caranx hippos	49	28	10	11
Caranx latus	22	17	5	0
Sphyraen aafra	4	3	0	1
Sphyraena barracuda	7	0	3	4
Sphyraena quachancho	11	4	3	4
Sphyraena sphyraena	20	10	5	5
Lutjanus agennes	7	0	0	7
Lutjanus dentatus	5	2	0	3
Lutjanu sendecacanthus	3	0	2	1
Catemoa fricana	11	7	4	0
Pseltias sebae	8	1	6	1
Diplodus carvinus	12	6	3	3
Diplodus puntazzo	19	8	6	5
Diplodus sargus	6	0	0	6
Pageilus bagaravo	3	0	3	0
Pagrus pagrus	10	5	5	0
Arius gagus	14	0	10	5
Arius heudeiot	2	0	0	2
Arius latiscutatus	9	0	6	3
Scomberus totor	4	0	3	1
Euthynnus alletteratus	5	0	5	0
Katsuwonus palamis	8	8	0	0
Total fish species caught	**350**	**151**	**114**	**85**

Conclusion

With the results obtained from this present study, the biodiversity of fish fauna in the Escravos Estuary, using Ita net was high. The total icthyofauna assemblage of the Escravos Estuary for the duration of this study identified 28 fish species belonging to 9 families. It also showed the catch composition and selectivity of the stow net, as well as, fish stock abundance in the Escravos Estuary around Okerenkoko and Kurutie axis of Delta State. This study serves as a baseline data which will assist relevant bodies in the management and conservation of fisheries resources in the Escravos Estuary. Further studies should also be carried out on the fish assemblage of the Escravos Estuary, using different fishing gear to monitor the fish stock and to get more information on their abundance, fishing gear selectivity and biology, and also laws and order should be enforced by relevant agencies in the management and conservation of our water bodies.

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