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Raining Season Ecological Survey of Artisanal Fish Landings in Tungbo, Bayelsa State, Niger Delta

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Abstract

*Artisanal Fishers catch in Tungbo river was studied to examine the various fish species and percentage abundance in Tungbo River between June-September 2017. Fish landings and gears used by Fishers were recorded at the different landing sites. Samples were collected every month randomly from the landing of artisanal fishers. Samples were identified with description checklist and keys to the species level. One hundred and ninety individuals (190) belonging to 12 families and twenty-one (21) species were identified. Synodontis ocellifer was the most abundant accounting for 16.84% of the catch. Gymnarchus niloticus and Malaptenurus electricus were the least having 0.53% abundance each. Cichlidae was the most dominated family (35.79%) while Malapteruridae and Gymnarchida**e** were the least dominated families of 0.53% each. Gears used were basket trap (Milian trap), hook and line, gill net, cast net, drum trap, and drag net. Gill net caught more fish species than other gears while the cast net recorded the least landing.*

Keywords: Artisanal, Catch, Fishers, River, Samples

Introduction

Fishes are usually largest number of aquatic animals found in different aquatic ecosystems. These water bodies include ocean, sea, rivers, estuaries and man-made ponds, lakes, borrow pit etc of which the fishes are mostly harvested by artisanal fishers. Artisanal fishers are small

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scale fishers, fishing for subsistence or local small markets and generally, using traditional fishing techniques and small boats. They are found around the world particularly in developing nations and are vital to food security and livelihoods.

Fish in natural aquatic habitat like fresh, brackish and marine waters close to the shore are the areas of harvest by artisanal Fishers. This has generated much interest to various works. Ita (1993) reported 268 different fish species in 34 well known Nigeria fresh water river, lakes and reservoirs which constitute about 12% of Nigeria's total surface area of about 98, 185, 000 h. Allison and Okadi (2013) reported relative abundance of icythyofauna and species in lower Niger Delta . Composition of fish species in any aquatic ecosystem is very important for both the fishers and fisheries researchers.

Human activities over the years have continued to modify the aquatic habitat through fishing pressure (Ngodigha, Gbarabe, & Abowei,2013). The impact of over fishing, environmental pollution and other human activities on biodiversity cannot be overemphasized. The negative implication of such is the significant decline on catch in some high valued species (Ngodigha, Gbarabe & Austin, 2018). It has been reported that in the 1980s fish production in the lower Niger Delta was less than half of the 1950s and fry-catching production was only one-fourth of that in the 1960s (Ita. 1993). The need to conserve the depleting aquatic biota of this area has attracted the attention of researchers particularly the aquatic ecologist.

Since fish is the cheapest source of animal protein to human, there is need to protect the aquatic ecosystem. In order for this to be achieved, detailed knowledge of the biodiversity of fresh water fish relative to habitat and artisanal fishing of these water bodies is of great importance.

Tungbo River is one of many rivers in Sagbama axis blessed with diversity of aquatic organisms making it one of the areas where fishing activities is prominent. Despite the fishing activities in the area, Tungbo has received little research attention, when compared to

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some rivers and estuaries in the Niger Delta. This research is therefore aimed at compiling the most abundant fish species caught by artisanal Fishers in the area.

Materials and Methods

Study Area

The study area lies between the latitude 4°14'N – 4°7'N and longitude 70°6'E – 7°14'E of the equator. The source of the river is from tributaries of Niger Delta and flows through south-west into the Atlantic ocean. It also channels its water to other smaller and bigger rivers during the peak of the flood.

The study area experiences two separate climate seasons; the dry season (November - April) and the wet season (May - September) respectively. Vegetation includes submerged and floating macropytes such as *Pistia stratioes* and *Lemma saluimia.* Other plants are *Elais guineensis and Symphonia globulifera.*The soil of the area is mainly loamy-clay gotten from the marshes. Human activitie include fishing and farming, mainly for subsistence and little of commercial purpose.

Sampling procedure

Fish samples were collected randomly from the landing artisanal fishers operating in the Tungbo River. Samples were collected every month from June to September 2017. The samples were sorted and identified to species level using fish identification according to Idodo-Umeh (2003) together with Olaosebikan and Raji (2013). Percentage abundance of each individual was estimated and the abundance of each species was estimated using Benech et al; (1983) where ≥ 10% = dominant, 1-9% = subdominant, < 1% (caught more than once) = occassional,< 1% (caught once)= rare. The different gears were identified.

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Results

As shown in Table1, One hundred and ninety individuals (190) were identified belonging to twenty-one species during the study. The fish species were: *Tilapia zilli*, *Hepsetus odoe*, *Heterotis niloticus*, *Parachama obscura*, *Parachama africana*, *Oreochromis niloticus*, *Oreochromis cureus*, *Tilapia marinae*, *Arius latiscutatus*, *Malaptenurus electricus*, *Marcusenuis psittacus*, *Hemichromis bimaculatus*, *Tilapia marinae*, *Gymnallabes typus*, *Disctichodus engycephalus*, *Gymnarchus niloticus*, *Erpetoichys calabaricus*, *Chromidotidapia guentheri*, *Tilapia guineensis*, *Hemichromis fasciatus*, *Tilapia dageti*, *Clarias marcromystax*, *Synodontis nigrita*, *Synodontis ocellifer*, *Clarias gariepinus* and *Hemichromis fasciatus*. *Synodontis ocellifer* recorded the highest abundance of 32, while *Malaptenurus electricus* and *Gymnarchus niloticus* recorded the least of abundance of 1 each. The dominant species were *Synodontis ocellifer*(16.84%)and *Marcusenuis psittacus*(10.53%). Subdominant species in decreasing order were: *Oreochromis niloticus = Tilapia guineensis > Gymnallabes typus> Hepsetus odoe > Tilapia mariae = Erpetoichys calabaricus = Clarias gariepinus > Hemichromis fasciatus > Tilapia zilli = Heterotis niloticus = Chromidotilapia guntheri > Parachanna obscura = Distichodus engycephalus = Tilapia dageti = Clarias macromystax > Arius arius = Hemichromis bimaculatus*. The rare species were *Malaptenurus electricus* and *Gymnarchus niloticus*.

Twelve families were recorded during the study period.Cichlidae had the highest number of representatives of eight species. Hepsetidae, Channidae, Malapteruridae, Mochokidae, Gymnarchidae, Arapaimidae, Mormyridae, Ariidae, Distichodontidae and Polypteridae recorded the least number of species of one each. Clariidae was represented by three species (Table 2). The dominant family in decending order were: Cichlidae> Mochokidae> Clariidae > Mormyridae. Subdominant families were Hepsetidae, Channidae, Arapaimidae, Ariidae,

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Distichodontidae and Polypteridae. While Gymnarchidae and Malapteruridae were occassional families.

Table 1: Fish species composition and abundance in Tungbo River.

SN	FISH SPECIES	ABUNDANCE	ABUNDANCE (%)
1.	*Tilapia zilli*	6	3.16
2.	*Hepsetus odoe*	11	5.79
3.	*Parachanna obscura*	5	2.64
4.	*Heterotis niloticus*	6	3.16
5.	*Oreochromis niloticus*	15	7.89
6.	*Arius arius*	2	1.05
7.	*Marcusenuis psittacus*	20	10.53
8.	*Malaptenurus electricus*	1	0.53
9.	*Hemichromis bimaculatus*	2	1.05
10.	*Tilapia mariae*	10	5.26
11.	*Gymnallabes typus*	14	7.37
12.	*Distichodus engycephalus*	5	2.63
13.	*Gymnarchus niloticus*	1	0.53
14.	*Erpetoichys calabaricus*	10	5.26
15.	*Chromidotilapia guntheri*	6	3.16
16.	*Tilapia guineensis*	15	7.89
17.	*Hemichromis fasciatus*	9	4.74
18.	*Tilapia dageti*	5	2.64
19.	*Clarias macromystax*	5	2.64
20.	*Clarias gariepinus*	10	5.26
21.	*Synodontis ocellifer*	32	16.84
	TOTAL	**190**	**100.00**

Table 2: List of fish families and species identified in Tungbo River, Sagbama Local Government Area of Bayelsa State in Niger Delta

SN	FAMILY	SPECIES	COMMON NAMES	ABUNDANCE (%)
1.	Hepsetidae	*Hepsetus odoe*	African pike	11 **(5.79)**
2.	Channidae	*Parachanna obscura*	Snake head	5 **(2.64)**
3.	Malapteruridae	*Malapterurus electricus*	Electric fish	1 **(0.53)**
4.	Mochokidae	*Synodontis ocellifer*	Upside down catfish	32 **(16.84)**

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5.	Clariidae	*Clarias gariepinus* *Clarias macromystax* *Gymnallabes typus*	African Catfish Mud Catfish Airbreathing Catfish	10 5 14
				29 (15.26)
6.	Gymnarchidae	*Gymnarchus niloticus*	Trunk fish, African Knife fish	1 **(0.53)**
7.	Cichlidae	*Tilapia zilli* *Oreochromis niloticus* *Tilapia mariae* *Tilapia guineensis* *Tilapia dageti* *Hemichromis fasciatus* *Hemichromis bimaculatus* *Chromidotilapia guntheri*	Redbelly Tilapia Nile Tilapia Spotted Tilapia Guinean Tilapia Banded jewelfish Jewelfish	6 15 10 15 5 9 2 6
				68 (35.79)
8.	Arapaimidae	*Heterotis niloticus*	African bony tongue	6 **(3.16)**
9.	Mormyridae	*Marcusenuis psittacus*	Elephantfish	20 **(10.53)**
10.	Ariidae	*Arius arius*	Threadfin	2 **(1.05)**
11.	Distichodontidae	*Distichodus engycephalus*	Perch	5 **(2.64)**
12.	Polypteridae	*Erpetoichys calabaricus*	African ropefish	10 **(5.26)**

Gears used by artisanal Fisher in Tungbo were basket trap (Milian trap), hook and line, gill net, cast net, drum trap, and drag net (Fig 1). Gill net caught more fishes followed by drum trap and drag net that caught same quantity of fish. The cast net caught the least number of fishes.

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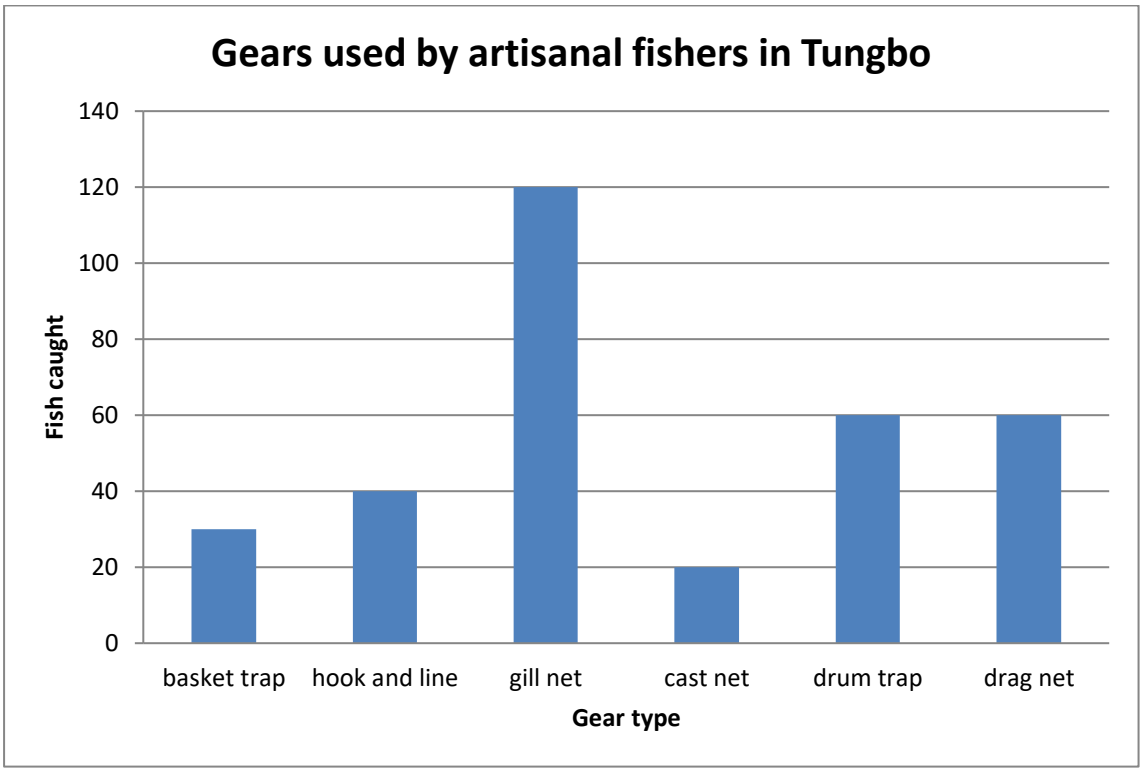

Fig 1: Fishing gears

Discussion

Comparing the result of the species landed with some studied in the Niger Delta, Tungbo River recorded low species diversity during the rainning season. As reported by Ogbeibu and Ezeunara (2002) on the impact of brewery effluent on Ikpoba River fish communities, 28 fish species in the two studied stations were recorded. In their study of Fish catch composition of selected small scale fishing gear used in the Bonny River, Rivers State, Olaniyi, Nkuena, & Henry (2017) reported 25 species while Alagoa, Ngodigha, Daworiye,Charles& Ipiteikemuh (2018) recorded 73 species in the Amassoma axis of River Nun during mid wet season and early dry season. The low species diversity could be attributed to biotic and abiotic factors such as rainfall in the water leading to depletion of the fish stock in the study area(Moses, 2001) or/ and anthropogenic activities rampant in the Niger Delta.

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The *Synodontis ocellifer* was the most dominant fish species of (16.84%), followed by *Marcusenuis psittacus* (10.53%).This findings differs from Ogbeibu and Ezeunara (2002) who reported electricians as the most dominant species in the stations. According to Benech et al; (1983) estimation, the rare species were *Malaptenurus electricus* and *Gymnarchus niloticus* since only one individual was recorded for each species.

The total of 12 families recorded during the study period differs from some studies in the Niger Delta. As reported by Olaniyi, et al (2017) 18 families were recorded in Bonny River during rainning and dry seasons. Alagoa et al (2018) recorded 28 families in Amassoma axises of River Nun from middle of the rainning season to the dry season. Other families such as Hepsetidae, Channidae, Malapteruridea, Mochokidae, Gymnarchidae, Arapaimidae, Mormyridae, Ariidae, Distichodontidae and Polypteridae were all represented by one species each excerpt for Clariidae that was represented by three species.

Cichlidae was the most dominant with 68 individual having 35.79% (Table 2). The result corroborates with those of Ogbeibu and Ezeunara (2002) but different from Olaniyi, et al (2017) who recorde Mugilidae as the dominant family. According to Ogbeibu and Ezeunara (2002) the family Cichlidae dominated the entire population in terms of number of taxa while Bagridae were the most abundant. The high diversity of Cichlidae family agrees with those of Alagoa et al (2018) who recorded Cichlidae as the most dominant fish species with 30 individual (7.79%). This could be due to the wide range of aquatic ecosystem habitat of Cichlids.

The variation in the number of fish species and abundance of fisher caught in the water body could be attributed to the fishing method employed and gear selectivity, which is related to size, and target species. Multiple gears used by the Fishers might have been responsible for the relatively higher species composition recorded. Fishing gears are designed to harvest fish from water bodied (Kwen, Davis & Binyotubo, 2013) for consumption. The gears reported by

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Kingdom and Kwen (2009) in Taylor creek are the same recorded in this study. Gillnet caught more fishes than all other gears used in the study area (Fig 1). This could be because gill nets are passive gears and so caught any fish that swims through it as long as the mesh size is suitable to catch the fish. Traps compared to other gears are design to catch live fish irrespective of age and size. Drum trap, which is also a passive gear, did not catch as much as the gill net. This could be due to the area where the trap was situated which limits attracting of fishes and the trap design. Drag net caught equal amount of fish as the drum trap. This could be due to the drag not operated in an enclosed ecosystem that could trap the fishes, but in an open aquatic environment. Hook and line and basket trap are passive gears. Their catch depends on the migration of fish to the placement area. Cast net an active gear had the least catch suggesting the level of abundance of fish population in Tungbo River in the rainning season where fishes migrate upstream to spawn. This is an indication of fish stock depletion due to either over fishing or pollution.

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