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Survey of the Present and Fast Disappearing Fish Species Along Two Rivers in the Niger Delta

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ABSTRACT

Fisheries resources are on the decline in Nigeria due to over exploitation and inadequate management of the coastal waters. For sustainability of these resources, an adequate knowledge of species composition, diversity and relative abundance of its water bodies must be understood and vigorously pursued. A survey was conducted to determine fish species diversity in Brass and Nun River, Niger delta, Nigeria and the socioeconomic studies carried out to determine the status of endanger or level of disappearance of fish species within study area. The survey identified 53 species from 18 families caught from Brass and Nun stations, respectively. The fish diversity ranged from typically freshwater fishes such as *Tilapia* and *Clarias* to brackish species such as *Chrysichthys nigrodigitatus* and *Penaeus* species. The most abundant family within catch were the Scianidae, Cichlidae and Clariidae. A checklist of economically important fast disappearing fish species along the two water bodies was generated. Oil spillage, discharges from industries (industrialization) and the domestic wastes from boundaries settlements (urbanization) and farming activities along the tributaries were among the factors identified to have contributed to low species diversity and fast disappearance of certain species. Data generated from this study would serve as baseline information for fisheries resource management.

Key words: Biodiversity, urbanization, brackish species, water quality, conservation, fish faunas, gill net

INTRODUCTION

The challenge of biodiversity conservation and management is not limited to terrestrial habitat alone but also the aquatic environment. This has therefore, generated much interest to various workers (Sugihara, 1980; Marais, 1988; Thiel *et al.*, 1995; Jordan *et al.*, 2010). Watters (1992) reviewed the biodiversity of fresh water fish in relative to habitat. Boulenger (1901) listed 976 species of African freshwater fishes comprising 185 genera and 43 families. Ita (1993) reported 268 different fish species in 34 well known Nigeria freshwater rivers, lakes and reservoirs which constitute about 12% of Nigeria's total surface area of about 98,185000 ha. Allison and Okadi (2013) reported relative abundance of ichthyofauna and species diversity being influenced by variation in mesh size in the lower Nun River. Gillnet selectivity had been reported by Sikoki *et al.* (1998). The impact of environmental pollution and other human activities on biodiversity cannot be overemphasized. The negative implication of such is the significant decline in catch in some high valued species. It is on record that in the 1980's, fish production in the river

was less than half of that in the 1950's and fry-catching production was only one fourth of that in the 1960's (Ita, 1993). Several factors continue rendering fish species endangered or threatened in the coastal waters. The objective of this study was to conduct a preliminary assessment on the status of such species in the Nigerian coastal water and determine the socioeconomic impact of the status of endanger or level of disappearance of such fish species.

MATERIALS AND METHODS

Study area: The study sampling areas were between latitude 4°51'N and 4°54'N and longitude 6°11'E and 6°13'E of Brass and lower Nun River around Anyama Ijaw in Bayelsa State as done by Allison and Okadi (2009).

Sampling procedure: This study was carried out between May and June of the study year. Specimen collection was carried out with the assistance of local fishermen using drift gill nets on canoes. Different fish species (live or freshly dead) were collected by fishermen at the different landing and were preserved on ice in which they were conveyed to the laboratory for identification and preservation. The physio-chemical characteristics like pH, water temperature (°C), dissolved oxygen (mg L^{-1}) and salinity (ppt) of the study areas were determined in-shittu with a digital water testing kit (Horiba U-10).

Specimen identification: Fish specimens were identified from monographs, description checklist and keys (FAO, 1990; Holden and Reed, 1972; Leveque *et al.*, 1991; Reed *et al.*, 1967). All the specimens were counted to determine family and species abundance from the two water bodies.

Distribution, abundance and level of disappearance: Structured questionnaires were administered on 163 fishermen, 145 fish sellers and 25 fish processors to determine level of fish disappearance, time, types of gear in use and possible emergence of new strains/species.

Statistical analysis: Data was analysed to check the significance of the results, using one way ANOVA.

RESULTS AND DISCUSSION

The average physio-chemical characteristics for the two water bodies are pH (6.3-7.9), water temperature (23-32°C), dissolved oxygen (6.5-9.2 mg L^{-1}) and salinity (0.0 ppt). These characteristics attest to the fact that the Lower Nun River and Brass at the study area end is an estuary of river Niger thus all the physio-chemical characters recorded were within its prevalent characters although the species composition showed presence of fresh, marine and brackish water origins. The typically brackish water fishes found at the Brass and lower Nun Rivers included the families of *Sciaenidae, Clupeidae, Penaeidae* among others are probably stenohaline fishes and may have moved only within narrow limits of salinity changes. This is consistent with the report of Moses (1987), who noted that during flood, some fish species could move to another aquatic habitat with different characteristics.

From the two study areas, total fish species composition comprised of fifty-three individuals from eighteen families (Table 1). The Sciaenidae and Cichlidae were the most abundant comprising of seven and five species each, respectively while the Palaemonidae, Sphyraenidae and Bagridae were the least abundant fish comprising one individual each.

The 53 species identified belonging to 18 families is an indication of a good biodiversity being highest in the Sciaenidae and Cichlidae. Dominance of *Pseudotholythus* and *Tilapia* species may

Table 1: Some of the prevalent families/species across stations

Family	Species	Brass	NUN
Sciaenidae	*Pseudotolithus typus*	√	√
	P. senegalensis	√	√
	P. elongates	√	√
	P. moorii	√	×
	P. epipercus	√	√
	Pteroscion peli	√	√
	P. brachygnathus	×	√
Polynemidae	Pentanemus quinquarius	√	√
	Galeoides decadactylus	√	√
	Polydactylus quadrifilis	×	√
Cynoglossidae	Cynoglossus browni	√	√
	C. monody	√	×
	C. senegalensis	√	√
	C. cadenati	√	√
	C. canariensis	√	√
Clupeidae	*Ilisha africana*	√	√
	Ethmalosa fimbriata	√	√
	Sardinella maderensis	×	√
	Pelonula leonensis	√	√
Carangidae	*Chloroscombrus chrysurus*	√	√
	Caranx hippos	√	√
	Trachinotus maxillosus	×	√
	Selene dorsalis	√	√
	Caranx crysos	√	√
Penaeidae	*Parapenaeopsis atlantica*	√	×
	Penaeus notialis	√	×
	Penaeus monodon	√	×
Portunidae	*Callinectes pallidus*	√	√
	C. marginatus	√	√
	C. amnicola	√	√
Palaemonidae	*Nematopalaemon hastatus*	√	√
Sphyraenidae	*Sphyraena guachancho*	√	√
Lutjanidae	*Lutjanus goreensis*	√	√
	Lutjanus dentatus	√	×
Cichlidae	*Tilapia guineensis*	×	√
	T. mariae	√	√
	T. melanopleura	√	√
	Hemichromis fasciatus	√	√
	Sarotherodon melanotheron	√	√
	Tilapia dageti (wesafu)	√	√
	Oreochromis niloticus	√	
Cyprinidae	*Labeo senegalensis*	√	√
	Labeo coubie	√	×
Bagridae	*Chrysichthys nigrodigitatus*	√	√
	Bagrus docmak	×	√
Schilbeidae	*Schilbe mystus*	√	√
	Schilbe intermedius	√	√
Characidae	*Brycinus nurs*	√	√

Table 1: Countinure

Family	Species	Brass	NUN
	Alester baremozee	√	×
Mockokidae	*Synodontis budjeti*	√	√
Drepanidae	*Drepane africana*	×	√
Palinuridae	*Palinurus regius*	×	√
18 Families	53 species	44 species	47 species

Table 2: Identified fast disappearing fish species on Nun and Brass water bodies by fisher folks

Common name	Binomial nomenclature	Family name	Importance	Water body
Tilapia	*Tilapia guineensis*	Chichlidae	Edible	Nun river
Monrovia doctorfish	*Achanthurus monroviae*	Acanthuridae	Edible	Nun
Grey triggerfish	*Balistes capriscus*	Balistidae	Edible	Nun and brass
Blue spotted trigger fish	*Balistes punctuatus*	Balistidae	Edible	Brass
Wide-eyed flounder	*Bothus podas africanus*	Bothidae	Edible	Brass
Blue spotted cornet fish	*Fistularia tabacaria*	Fistularidae	Edible	Brass
Pink Shrimp	*Penaeus notialis*	Penaeidae	Edible	Nun and brass
Bonga shad	*Ethmalosa fimbriata*	Clupeidae	Edible	Nun
Blunt head puffer	*Sphoeroides pachygaster*	Tetradontidae	Edible	Brass
Round string rays	*Taeniura grabata*	Dasyatidae	Edible	Brass
Giant atlantic mauta	*Mauta birostris*	Mobulidae	Edible	Brass
Greater guinean	*Mobula coilloti*	Mobulidae	Edible	Brass
Violet skate	*Raja doutrei*	Rajidae	Edible	Brass
Bivalves oysters	*Crassostrea gazaar*	Ostreidae	Edible	Brass
Giant sea catfish	*Arius gigas*	Ariidae	Edible	Brass
Catfish	*Chrysichthys* spp.	Clariidae	Edible	Nun
Dolpin	*Coryphaena equiselis*	Platanistidae	Recreation	Brass
Sardines	*Sardinella maderensis*	Clupeidae	Edible	Brass
Mullet	*Liza grandisaquamis* and *Mugil curema*	Mugilidae	Edible	Nun River
African brown snapper	*Lutjanus dentatus*	Lutjanidae	Edible	Nun
African red snapper	*Lutjanus agennes*	Lutjanidae	Edible	Nun
Hammer head	*Sphyrna lewni*	Sphyrinidae	Commercial	Brass
Manatee	*Trachechus senegalensis*	Delphinidae	Commercial	Brass
Shiny nose	*Polydactylus quadrifilis*	Polynemidae	Edible	Brass
Synodontis	*Synodontis budgetti*	Mochokidae	Edible	Nun

be attributed to gear selectivity (mostly gill net). The result is similar to the findings of Allison and Okadi (2009) and Sikoki *et al.* (1998) who encountered 25 species in 14 families and 24 species belonging to 16 families in the same area of Nun river Niger delta. However, Schilbeidae and Cyprinidae were the dominant families they reported. The presence of these two families (Schilbeidae and Cyprinidae) in Nun River and Brass were also reported in this study. But the presence of Distichodontidae, Gobidae, Elopidae, Mormyridae and Anabantidae were not observed in this study which were part of the fast disappearing groups. Conversely, Lutjanidae and Penaeidae which were not observed in the study of Allison and Okadi (2009) were present in this study.

The fast disappearing species which accompanied low catch in quantity (Table 2) identified in the socio economic analysis of this study showed that environmental degradation and overfishing are the essential reasons for their disappearance (Fig. 1). The decline of biodiversity resources in
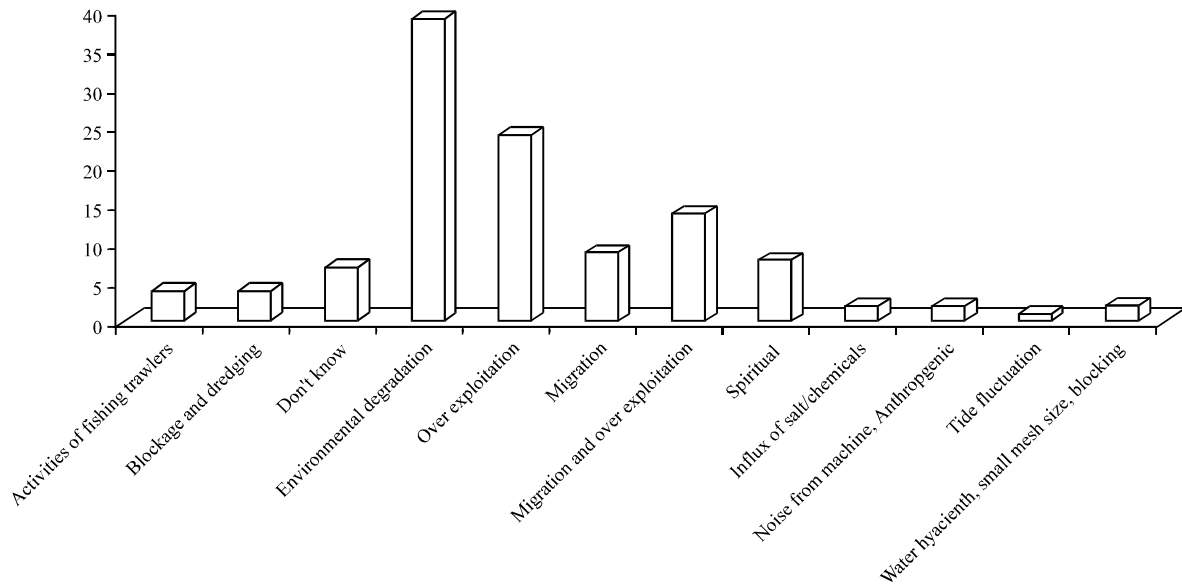
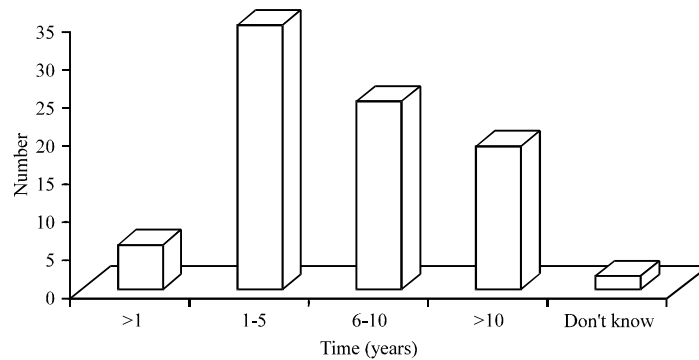Fig. 1: Reasons for disappearance of important fish stocks from the fishing communities studied

Fig. 2: Time of disappearance of some major species from study communities

the studied waters could therefore be attributed largely to human factors in the last 5-10 years (Fig. 2). This kind of human impact as earlier been reported by Kone *et al.* (2003) in the GO River (Ivory Coast) and Gratwicke *et al.* (2003) in the upper Mangame River of Zimbabwe. Some other common species or strains identified by the fisher folks as fast disappearing in local dialect such as 'Sala', 'Gbolo', 'Nda', 'Ofoun', 'Benioke', 'Odubemi', 'Tomi', 'Asakabumoun', 'Asakara-bumoun', 'Ikoloko', 'Irim' and 'Ekwekwey' are yet to be identified. Recent experience from IUCN (1996) is that wherever fish faunas are studied, more species than suspected turn out to be threatened (i.e. species are at risk of extinction), or cannot be re-recorded at all.

Gill net was recorded as the dominant fishing gear in the study area (Fig. 3) although multiple gears were employed as suggested by Allison *et al.* (1997) which might have been responsible for the relatively higher species composition recorded compared with earlier studies of Allison and Okadi (2009) and Sikoki *et al.* (1998).
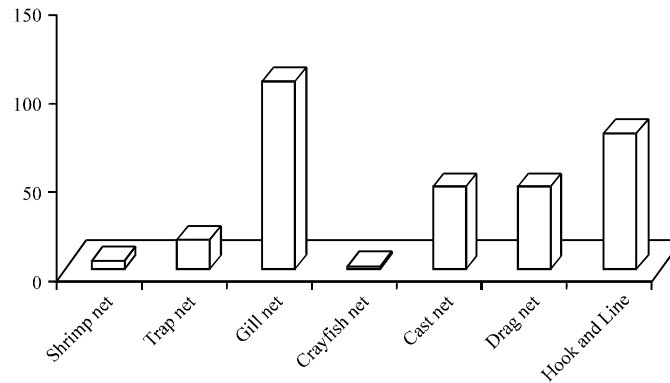
Fig. 3: Type of fishing gears used in study areas in Nun and Brass river system of Niger Delta

CONCLUSION

This study complements previous studies on species diversity and abundance distribution in these two important water bodies of the Niger Delta. Fish population are declining as they are been depleted faster than they are able to restore their number. This study identified and recommends conservation and friendly environmental approaches as well as socio and economic consideration as a tool to fisheries management to prevent extinction of our valuable fish species. Fishing needs to be limited along the Niger delta coastal area and fish farming should be enhanced to provide for the growing demand among the populace. This will encourage fisheries resources conservation as well as farmed fish production and enhance more jobs for the local people in Nigeria.

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