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SEASONAL VARIATIONS IN THE ABUNDANCE OF CLUPEIDAE, SCAINIDAE AND MUGILIDAE IN FORCADOS RIVER ESTUARY.

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Abstract

Seasons play a significant impact in fish fauna composition in the tropics. This study attempts to determine the seasonal variations in the composition of some economically important fish species in the Forcados River estuary. Fish samples were collected from artisanal fishermen between January 2017 and January 2018. The sample specimens were sorted, identified and counted in the laboratory. A total of 4511 individuals were caught during the sampling period. During the dry season, a total of 2684 or 59% were seen. On the other hand, a total of 1827 accounting for 41 % were recorded during the wet season. Mugilidae dominated the rainy season catch while the dry season catch was dominated by clupeidae and Scainidae. Forcados River estuary is rich in the abundance of fish species that have an interesting seasonal twist. More research along this line is encouraged for optimal food production and conservation.

Keywords:

Forcados River estuary, Niger Delta, Clupeid, Scainidae, Mugilidae, Seasons

Introduction

Estuaries are highly productive transient environments that provide critical means and services for human survival and development and thus many communities emerge around these water bodies. Forcados River estuary is not an exception in hosting a great number of communities (Opute, 2000) due to its highly productive nature in the Niger Delta region, supporting a large number of economically and

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ecologically and important aquatic biodiversity (Opute, 2000; Iwegbue et al. 2018; Ogidiaka and Ikomi, 2021; Ogidiaka at al., 2022).

Clupeidae, scainidae and mugilidae have been reported to be among the dominant and economic fish species of fish in Forcados River estuary (Ogidiaka and Ikomi, 2021). Clupeids have special body scales unique among the teleost fishes (Leyli et al., 2020). They are filter-feeders and possess diverse groups of trophic feeders and habitats (Leyli et al., 2020). Mugilids are ray-finned fishes serves as important source of food to many coastal in Nigeria (Ogidiaka and Ikomi, 2021). The genus Pseudotolithus (Family Sciaenidae) are also known as Croakers. They constitute an abundant and commercially important fish in Nigerian inshore waters (Isangedighi, 2001; Ogidiaka and Ikomi, 2021).

A good understanding of the seasonal variations in fish abundance has important implications for biodiversity protection and effective conservation strategies (Costa et al., 2018). One of the objectives of fish community ecology is to determine the seasonal variations in the relative abundance of species and this has been the focus of many studies (Castillo-Rivera, 2013).

Previous research works documented on the estuary include works by Ogidiaka and Ikomi, 2021; Ogidiaka et al., 2022). None of these works compared the seasonal catch of these ecologically important species. Thus, the objective of this study was to determine the seasonal variations in these dominant fish species in Forcados River estuary.

MATERIALS AND METHODS

Description of the study area

Forcados River estuary can be found between latitude 5^0 211 – 5^0 35 N and longitude 5^0 31 – 5^0 511 E. There are two main seasons: wet and dry seasons. The raining season begins from April to November while the dry months starts from November to March.

Laboratory studies

Fish samples were collected from artisanal fishermen between the months of January 2017 to January 2018. The specimens were sorted, identified, counted, and labelled in appropriate containers using fish identification keys according to Idodo-Umeh, 2003; Olaosebikan and Raji, 2013).

Result

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Table 1 shows the seasonal variations in number of individuals. A general trend of higher catch in the dry season was observed. A total of 4511 individuals were caught during the sampling period. During the dry season a total of 2684 or 59% (fig 1) were caught. On the other hand, a total of 1827 accounting for 41 % (fig 1) were recorded during the wet season.

Table 1: Seasonal variation in the number of individuals of fish caught.

S/N	Family/Species	Total Abundance	Dry season	Rainy season
1	*Ethmalosa fimbriata* .	983	605	378
2	*Ilisha africana*	621	472	149
4	*Pseudotolithus elongatus*	860	663	197
5	*Pseudotolithus senegalensis*	690	480	210
6	*Liza falcipinnis*	870	260	610
7	*Liza gradisquamis*	275	125	150
8	*Mugil liza*	22	11	11
9	*Mugil cephalus*	190	68	122
	Total	4511	2684	1827
	Percentage		59.0	41.0

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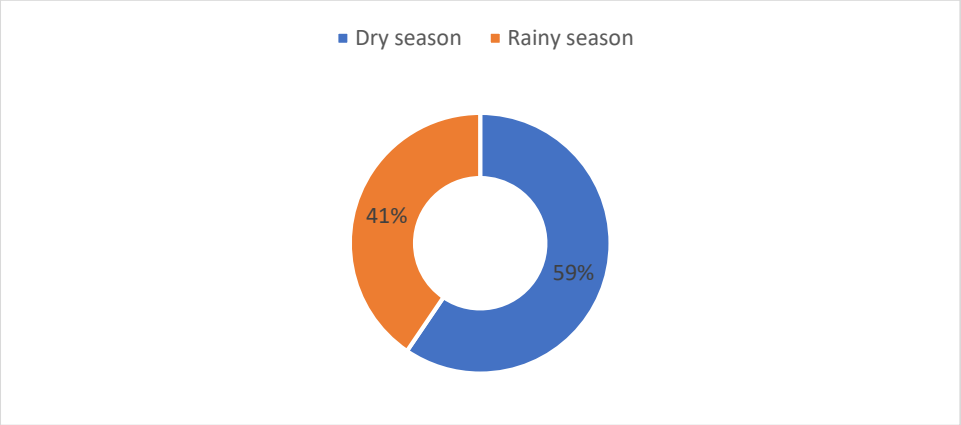

Fig 1: Seasonal variation in the percentage of the total individuals of fish caught.

Mugilidae dominated the rainy season catch as shown in fig 2 while the dry season catch was dominated by Clupeidae and scainidae.

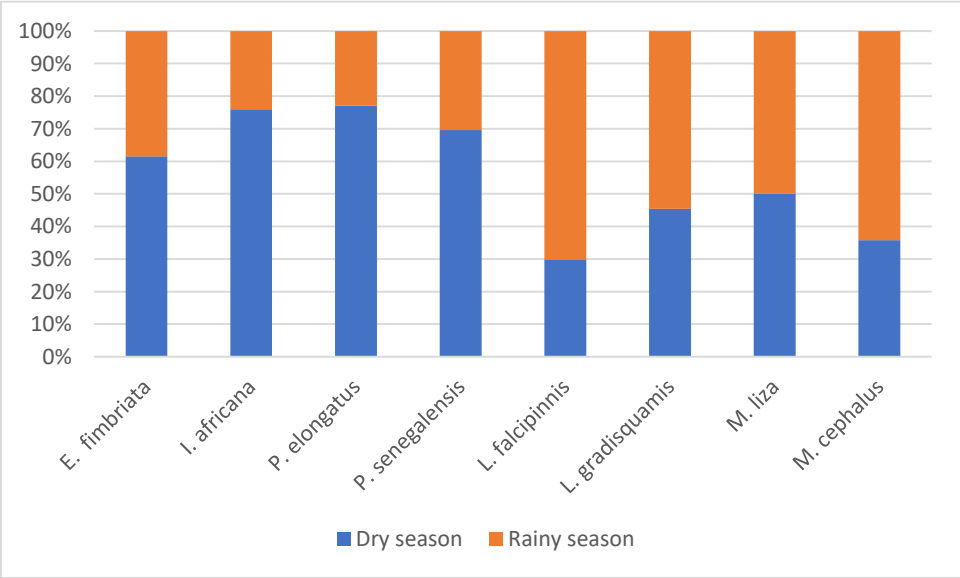

Fig 2: Percentage of the individual species caught seasonally during the study period

The family clupeidae showed higher abundance during the dry season (Fig. 3). Similar trend was observed in the family scianidae while mugilidae recorded higher abundance in the rainy season during the study period.

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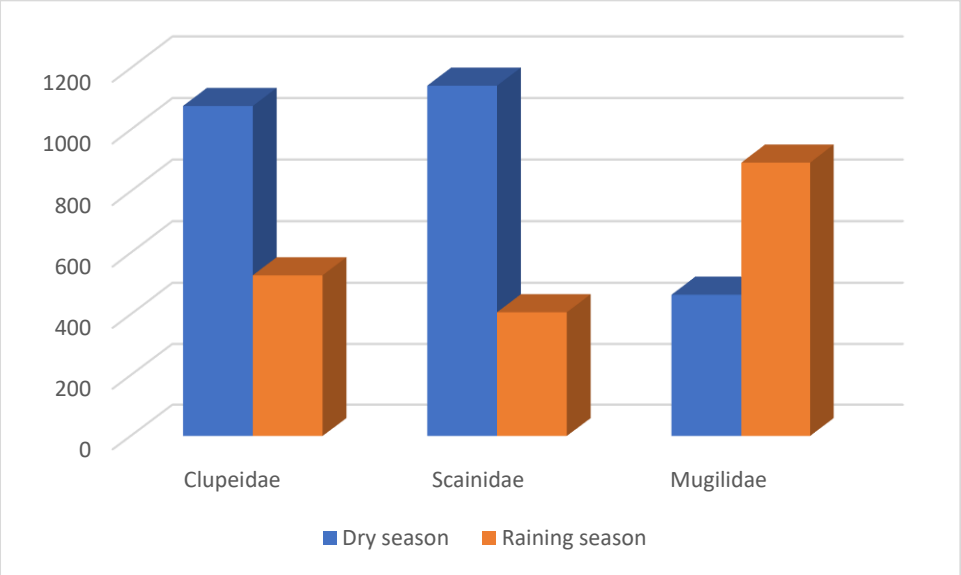

Fig. 3: Seasonal variation in the abundance of the three dominant families in Forcados river estuary

Discussion

The high numbers of fish caught is a pointer to the fact that there was resource partitioning where the different fish species caught fully utilized the available resources in the water body in both seasons.

From the result, it was observed that the fish caught during the dry season were more. This could be associated with the more stable environmental conditions associated with the dry season. The raining season period is usually associated with influx of waste/turbid water, fluctuating dissolved oxygen, salinity and nutrients. Abundance of clupeid recorded during the dry season is in line with reports by Udo and Bassey, 2017 in Cross River estuary. This could be further buttressed by the abundance in the catch of *E. Ethmalosa* in a trawl catch off Aiyetoro Coast during the dry months (Kusemiju and Onadeko,1990).

The wet season seems to favour the abundance of mugilidae and agrees with reports by Udo and Bassey, 2017. This could be as a result of food abundance during the raining season. In addition, large volumes of water in the wet season is characterised with restricted movements which makes many fish less vulnerable to catch (Offem et al., 2011). Thus, possibly increasing fish abundance when appropriately targeted. Four species (L. *falcipinnis*, *L. grandisquamis*,

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Mugil cephalus and *M. Liza)* (*Liza dumerili, L. falcipinnis, L. grandisquamis, Mugil cephalic* and *M. curema*) caught in the Lagos lagoon during the dry season from December 2007 to March 2008 as reported by Soyinka and Adekoya, 2011.

Number of species collected was dominated by *L. falcipinnis* and was at variance with reports of *Liza dumeril*i recording the highest number in Lagos Lagoon Soyinka and Adekoya, 2011.

Seasonal variations in the abundance of fish species in subtropical and tropical estuaries have been linked to changes in rainfall patterns (Castillo-Rivera, 2002; Meynecke, 2006] and also inflows of freshwater (Kimmerer, 2002, Tsou and Matheson, 2002, Young and Potter, 2002). In addition, water quality, such as salinity and turbidity have significant impacts on fish composition and distribution, and their concentrations are influenced by seasonal rainfall patterns (Blaber, 1995; Martino and Able, 2003; Barletta et al., 2005).

Furthermore, the temperature has been identified to be another factor significantly influencing the seasonal composition and abundance of fish species in estuaries (Harrison and Whitfield, 2006, Methven et al., 2001, Hagan and Able, 2003; Castillo-Rivera, 2002; Vorwerk et al, 2003; James et al., 2013).

Conclusion

Forcados River estuary is rich in the abundance of fish species that have an interesting seasonal twist. The high species value recorded during the dry season period may be a pointer to the fact that the environment were more stable and reproduction was also at its peak. More research along this line is encouraged for optimal food production and fish conservation.

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