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SHRIMP BY-CATCH SPECIES FROM INDUSTRIAL SHRIMP TRAWL FISHERIES IN LAGOS ,NIGERIA COASTAL WATERS

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ABSTRACT

A fisheries-dependent surveys was conducted to identify and quantify the species composition of shrimp by-catch and its effect on fishery sustainability. Samples were bought monthly, from October 2009 to June 2010 from landings site, at Apapa-Liverpool market Lagos. 25 fish species belonging to 18 families targeted in other inshore fisheries constituted the by-catch species. The percent of weight compositions of some economically important by-catch species were: *Pseudololithus senegalensis* (5.76%), *Ilisha africana* (14.65%), *Pentanemus quinquarius* (2.94%), *Pteriscion peli* (6.60%), *Galeoides decadactylus* (3.17%), *Cynoglossus senegalensis* (6.76%) *and Chloroscombrus chysurus* (10.81%). About 80% of the shrimp by-catch species were juvenile fin fish. However, continuous harvest without appropriate mitigating measures poses a threat to sustainability of coastal capture fisheries. Recommendations are proffered in order to conserve the resources for sustainable development.

Keywords: By-catch; Coastal; Shrimp trawl; Fisheries; Industrial

INTRODUCTION

The incidental capture of by-catch (non-target species) and discards from shrimp trawl fisheries has been a major concern world-wide (Saila, 1983; Andrew and Pepperell, 1992; Alverson et al., 1994 and Kennelly, 1995; FAO, 1999 and Gray et al., 2001).The world-wide concern is because it may reduce the potential biomass and yield of stocks that form the basis of other fisheries, thereby affecting the sustainability of marine capture fisheries (Gordon, 1988; Foldren, 1989 and Hall et al., 2000). Alverson et al. (1994) estimates global annual discards in commercial fisheries as approximately 27 million metric tonnes. In Nigeria, the shrimp trawl fisheries is very important and the target species *Penaeus notialis* and *penaeus monodon* are exploited in inshore water by industrial fisheries for export. Nigeria has the largest shrimp trawler fleet in the Africa region with 212 licensed vessels in 2002 catching approximately 12,797 tonnes/year, it contributes significantly to wild – caught shrimps from the tropics. (FDF, 2009). Presently, more tones of fish have to be imported to meet the high demand for fish (which is the major source of animal protein in Nigerian diet). Hence, about 557,884.00 tonnes of fish imported by Nigeria Government in year 2000 has increase to 739,666.12 tonnes in 2007 likewise the dollars spent from 1995-2007 increased at an estimated interval of $100,000 per year. (FDF, 2009).A major NIOMR intervention in 2005 was the provision of Turtle Excluder Device and By-catch Reduction Devices for the industrial shrimp fisheries.(Solarin and Ambrose,2005), BRDs and TED have been adopted, however, monitoring at sea for compliance is very challenging. In the industrial shrimp fisheries, a codend mesh of size 44 mm stretched is enforced, trawling for shrimps is prohibited within the first five nautical miles of the Nigerian continental shelf and in waters shallower than 18m which is statutorily reserved for small scale artisanal fisheries. It is common to see several canoes going after fishing trawlers for the sake of buying by-catch and discards. However, there is need for assessment of the present practices, and determine quantity and species composition of by-catch generated in the industrial shrimp trawl fishery. Hence, the objective of this study is to identify and update the shrimp by-catch species composition from industrial shrimp trawl fishery.

MATERIALS AND METHOD

Study Area : Nigeria lies between Lat. 4° 16' -13° 52 'N and Long. 2° 49' -14° 37' E and has a coastline of about 850 km which borders the Atlantic Ocean in the Gulf of Guinea. The limits of Nigeria's territorial waters and Exclusive Economic Zone (EEZ) are 12 nml and 200 nml respectively (i.e. 22 224 km and 370.40 km). (Allen and Wells, 1962; Awosika, 1990). The Nigeria Coastline stretches from the Western border with Republic of Benin to the Eastern border with Cameroon Republic.

Sampling method: Samples were bought monthly from replicate landings of motorized boat (middle men) from the sea to the shore, between October 2009 to June 2010, at Liverpool market, Apapa Lagos.

The samples were taken to the Marine biology laboratory of Nigerian Institute for Oceanography and Marine Research where it is sorted into species and higher taxa, and identified using morphometric and meristic features FAO, (1995). The following information were recorded: The length-frequency, length-weight relationship, total weight (kg) of shrimp and by-catch species and numbers and sizes of by-catch species composition (fin and shell fish). The total weight of by-catches sampled from fishery-dependent surveys were pooled and averaged.

RESULTS

During the survey, 3,623 individual fin fish belonging to 25 species of 18 families were identified as shrimp by-catch (Table 1). All the species were juveniles caught within the nursery ground. About 80% of the by-catch

sample bought were commercially important fish species as also reported by Ajayi and Adetayo, (1982), Kennelly et al., (1998) and Ambrose et al., (2004). The size of by-catch fish species ranged from 3 to 22 cm total length, although several species were commonly caught at greater sizes (table 1), for example *Raja miraletus, Sphyraenae guanchancho, Trichiurus lepturus, Cynoglossuss senegalensis* were consistently caught at sizes >20cm. The fin fishes were numerically dominant, though some crustaceans were also identified, including crabs. The percentage weight compositions of commercially important by-catch species were: *Pseudotolithus typus (0.25%), P. senegalensis (5.76%), Ilisha africana (14.65%), Pentanemus quinquarius (2.94%), Callinectes amnicola (2.67%), Pteroscion peli (6.60%), Galeoides decadactylus (3.17%), Cynoglossus senegalensis (6.76%) and Chloroscombrus chysurus (10.81%).*

The haemulidae family (*Brachydeuterus auritus*) was the most abundant by-catch species followed by Carangidae > Sciaenidae > Trichiuridae > Clupeidae > Cynoglossidae > Polynemidae >Portunidae > Drepanidae. The trend is consistent numerically per landings but with slight variations in weights.

Table 1: List of shrimp by-catch composition in the sample collected.

S/N	Family	Scientific Name	Common Name	Weight	Weight (%)	Total No	Total No (%)	Total-length Range(cm)	
1	Polynemidae	*Pentanemus quinquarius*	Royal thread fins	1.71	2.95	123	3.40	7-18	
2	Polynemidae	*Galeoides decadactylus*	shiny nose	1.84	3.17	100	2.76	6-10	
3	Sciaenidae	*Pseudotolithus typus*	Long neck croaker	0.15	0.26	7	0.20	12-15	
4	Carangidae Sciaenidae	*Pseudotolithus senegalensis Chlorosrombrus .Chrysurus*	Cassava coaker caran	3.34	5.76 6.27	262	10.81034483 7.23	6-21 499	13.7731
5	Sciaenidae	*Pteriscion peli*	Boe drum	3.83	6.61	339	9.36	5-15	
6	Clupeidae	*Ilisha africana*	Africa shad	8.5	14.66	422	11.65	6-21	
7	Clupeidae	*Sardinella mardarensis*	Sardine	0.17	0.30	11	0.31	3-12	
8	Carangidae	*Selar crumenoph thalmus*	Big eye scad	0.01	0.01	1	0.03		
9	Carangidae	*Scelene dorsalis*	Moon fish	2.39	4.12	114	3.15	4-22	
10	Carangidae	*Chlorosrombrus .Chrysurus*	Caranx	6.27	10.81	499	13.78	5-20	
11	Cynoglossidae	*Cynoglossus senegalensis*	Sole fish	3.92	6.76	233	6.43	6-25	
12	Batrachoididae	*Pelutilibatrachus rossignoli*	Rossignol toad fish	0.07	0.12	5	0.14	9-13	
13	Batrachoididae	*Batrachoides liberensis*	Harry toad fish	0.4	0.69	31	0.86	6-9	
14	Platycephalidae	*Grammoplites gruveli*	Guinea flat head	1.48	2.55	118	3.26	8-17	
15	Haemulidae	*Brachydeuterus auritus*	Sompat grunt	10.67	18.40	776	21.42	6-15	
16	Tetraontidae	*Lagocephalus laevigatus*	Smooth puffer	0.27	0.47	29	0.80	6-14	
17	Rajidae	*Raja miraletus*	Brown ray	0.37	0.63	2	0.06	35-36	
18	Ophididae	*Brotula barbata*	Bearded profuls	0.05	0.09	7	0.19	9-13	
19	Citharidae	*Cithanus lingatula*	Spotted flounder	0.05	0.09	3	0.08	10-15	
20	Scrombridae	*Scrombrumerus tritor*	WAfrican Spanish markerel	0.1	0.17	6	0.16	12-15	
21	Serranidae	*serranus accarensis*	Ghanean comber	0.01	0.02	5	0.14	8-9	
22	Sphyraenidae	*sphyraena guachancho*	Baracuda	0.67	1.16	31	0.856	10-29	
23	Trichiuridae	*Trichiurus lepturus*	Silver fish	9.32	16.07	450	12.42	7-50	
24	Drepanidae	*Drepane Africana*	Spade fish	0.53	0.91	46	1.27	3—10	
25	Portunidae	*Calinectes amnicola*	Blue crab	1.55	2.67				
	Total mean			58		3,623			

DISCUSSION

The by-catch assessment in this study are partially consistent with the generalizations about by-catch from shrimp trawl fishery as reported by Ajayi and Adetayo,1997; Akande, 1997 and Olaniyi, 1999, which state;(i) that small fin fishes, usually <20 cm long and often juveniles, of relatively few species dominate by-catch and (ii) that the shrimp by-catch in trawl landing constitute more than 70% and sometimes around 90% juvenile and small sized fish.In this study, the by-catch were <20cm in length and mostly juvenile could be attributed to the trawling ground as breathing ground or because of the size of the target species. (Solarin et al, 2006). However,

the concern is in the sizes of the various fish species landed and the high percentage of the juvenile in shrimp trawl fisheries which may reduce the potential biomass and yield of stocks that form the basis of other fisheries, thereby affecting the sustainability of marine capture fisheries as reported by Hall, et al., (2000). It may also pose a threat to fisheries sustainability in Nigeria Coastal waters, as well as a major barrier to sustainable fisheries world over.

CONCLUSION

This study confirms the fact that shrimp by-catch species are mostly juvenile fin fishes and other invertebrates including crabs. However, conservation strategies to reduce by-catch in shrimp trawl fisheries are highly pertinent to maintenance of biodiversity and also the sustainability of Nigerian Fisheries. There is urgent need for proper on- board monitoring of shrimp trawlers to ensure mandatory incorporation of By-catch Reduction Devices (BRDS) and Turtle Excluder Devices (TEDS) in trawl nets. Furthermore, the need for onboard observer programme to take stock of fish caught as by-catch at sea cannot be overemphasized to facillitate collection of valuable catch data which are useful for planning and management purposes.

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