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Cast net design characteristics, catch composition and selectivity in tropical open lagoon

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Cast net design characteristics, construction, operational techniques and selectivity in Lagos lagoon, Nigeria was examined between September and December 2005. Netting materials for cast net construction in Lagos lagoon were monofilament nylon, poly-ethylene (PE) and polyester (PES). The conventional ratio 1:2 of the number of meshes in the length of the apical panel to the second was not adopted by the fishermen. The cast net length was 1.77 m and net mouth area was 4.99 m². Twenty-one fish species belonging to 19 families were caught during the study period. *Sarotherodon melanotheron* was numerically most abundant in Lagos lagoon. Numerically, more fish specimens were caught at night than daytime. The higher the effort (throw) the more the cast net catches. The condition factor (K) of fishes in the lagoon ranged between 0.27 and 3.0. The crustacean had the overall highest condition factor. A total of 1,501 specimens (30 kg) at ₦ 4, 500 (USD 32.14) were caught for 11 trips (247 casts) for 38.7 h. The Catch Per Unit Effort (CPUE) (number of catch per cast) ranged between 0 and 6; the average number of cast per hour was 6. Cast net was not species specific. The smallest fish (*S. melanotheron*) had a burst speed of 51 cm per second while the largest (*L. falcipinnis*) had a maximum burst speed of 262 cm per second. Cast net was selective for shallow water species. Cast nets durability ranged from 3 months to 3 years depending on the netting material and the environment where it is operated.

Key words: Cast net, selectivity, burst speed, hanging ratio.

INTRODUCTION

The cast net is the one of the most widely used artisanal fishing in Nigerian brackish as well as coastal waters (FAO, 1969). The cast nets are falling gear, conical in shape with lead sunken or weights attracted at regular intervals on the lead rope forming the circumference of the cone. Cast nets vary in lengths ranging from 4.20 to 7.11 m (Azeez, 1997).

Some cast nets are designed such that the lead rope per net is tucked underneath and attached at intervals to the innerside of the net to form pockets for trapping fish especially *Tilapia* spp. (Udolisa and Solarin, 1979). Cast nets are cast from the shore or from a boat and they catch the fish by falling and closing in on them. These nets are usually used in shallow waters (Nedelec, 1982).

Throwing a cast net requires a great skill such that it will fold in the form of a large circle and this cover the largest possible area. The nets are usually cast at random in depths of up to four metres. When fishing for certain species of fish, the fisherman remains poised at alert until the tell-tale whirl of a fish is seen and then throws the net which encircles the exact spot (Azeez, 1997). The fishermen allows the net to sink to the bottom and entangles the fish, after which the net is retrieved with the aid of a line while the leads/sinkers close together thus capturing the fish (Azeez, 1997; Emmanuel and Kusemiju, 2005).

Fishermen often cast nets in groups in one place for one or more, then move to another area a mile or so way (Reed et al., 1967). For an efficient fishing operation, the fishermen must be strong enough to throw the size of the cast net in use. In the Lagos lagoon, the cast net line is held by the fisherman for retrieving the net; while the net is folded its length looped under the arm with the sinkers being free.

Group cast netting is practiced in Lagos lagoon mainly by the migrant Beninois fishermen using 8 to 15 canoes

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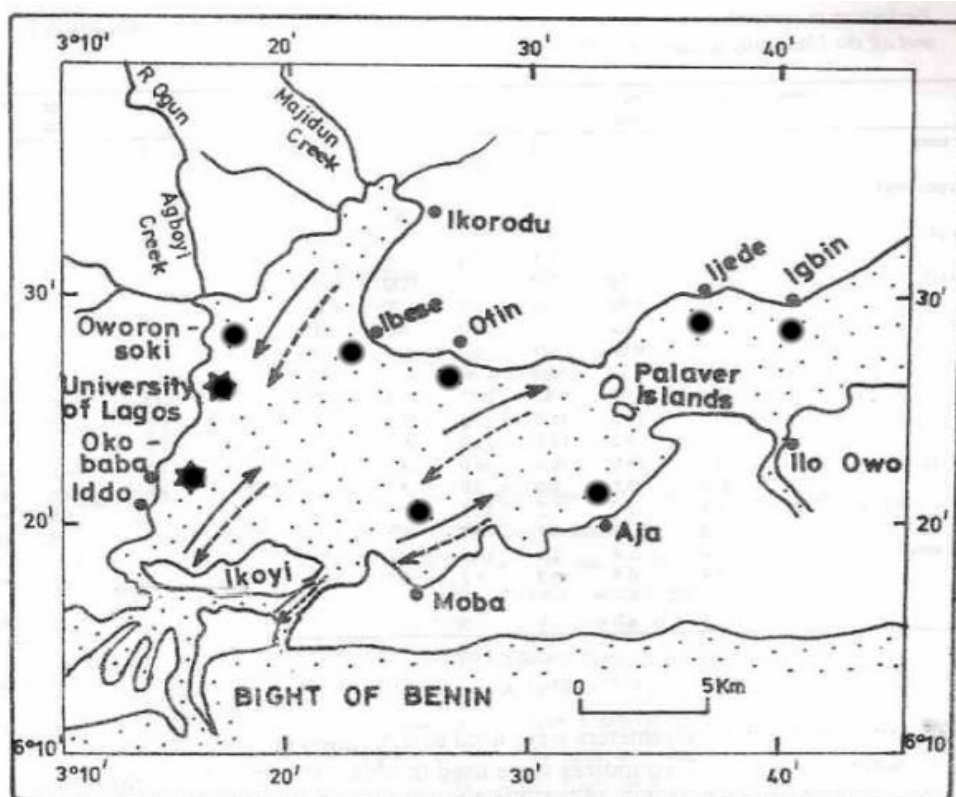*Corresponding author. E-mail: monetemi@yahoo.com.

Figure 1. Map of Lagos lagoon showing fish sampling sites.

each manned by at least two men. The canoes are maneuvered to form a big circle and the net throwers one from each canoe throw simultaneously either in clockwise or in anticlockwise manner. In some few occasion, fishermen arrange in two lines facing each other and cast their nets into the area between one ends to the other. The share per fishermen at the end of the fishing operation can be 5 – 8 kg (Udolisa and Solarin, 1979).

Udolisa and Solarin (1979) also reported the use of "garri" (processed cassava, *Manihot utilisima*) as bait to entice and concentrate fishes to marked fishing spots. Azeez (1997) reported the use of light in cast net operations. It was reported further that Alladin lamps was hung on a row of poles fixed in the lagoon at about 4 - 6 m above the water surface before the fishing operation commenced.

Cast net operation was described by Udolisa and Solarin (1979) as throughout the year and that fishing during the day was more common than light fishing at night. Emmanuel and Kusemiju (2005) reported that more fish were caught using cast net in the dry season than rainy season because of a more conducive environment created for euryhaline species. They reported further that cast net was an active gear, capturing live fish in its pockets. Despite the importance of the cast net to the artisanal fishery in Nigeria, very few information is available on its design details, cost of construction, durability

and selectivity. Therefore, this study investigate the design details, construction costs, durability, catch compositions, selectivity, efficiency and economic importance of cast net and its impacts on the Lagos lagoon fishery.

MATERIALS AND METHODS

Description of study area

Lagos lagoon which has both brackish and freshwater character-ristics is a large stretch of water which is part of continuous train of lagoons and creeks along the coast of Nigeria from the Republic of Benin boarder to Niger Delta. It has an area of about 65 km² (FAO, 1969) and is being fed from the north mainly by the Perennial Ogun River, bounded in the south by five cowrie creek and opens into the Gulf of Guinea via the Lagos Harbour.

The lagoon has a salinity range of 0 – 28.9% between the peak of the rainy season to the peak of the dry season. There are many fish landing stations along the lagoon beach (Figure 1). Most of the fishermen in the landing places have their houses constructed of planks and raffia directly on the lagoon. The houses are connected to the land by wooden jetties. Some of the fish landing places are Bariga jetty, Oko Baba, Makoko better, Maroko and Ajah.

Field operations

A monthly cast net catch composition was examined for 4 months (August – November, 2005). Samples were also collected for day and night variation analysis for three months (September – November, 2005).

A canoe was used with two fishermen. One fisherman manoeuvres the canoe with paddle when the other fisherman casts along on the lagoon. When about to cast the net the net rope was held for easier retrieving net after casting. The net was then folded to form a loop under the arm with about one third of the net towards the mouth being free. The nets were casted either on sighting a fish shoal or without sighting one, the net was thrown in a manner such that it unfolds its full mouth area on the surface of the water. The sinkers were allowed to sink the net to the lagoon bed to enclosing fishes with body girths above the minimum circumference of the net meshes. The net was allowed to stay for about 3 min, then it was retrieved into the canoe by pulling the retrieving rope skillfully and the fish caught in its pockets were removed into the canoe.

Fishing grounds, periods and durations

The fishing grounds used for this study were: Oko - baba, Moba, Oworonsoki, Ogudu, Ofin, Aja, Ijede, Ibese and University of Lagos beach (Figure 1). The fish specimens were either caught during daytimes or during night times. During night fishing operations no lantern was used. The fishing duration was maintain between 1 and 2 h

Laboratory analysis

All samples were transported to the laboratory and put in a deep freezer (< 4°C) immediately after appropriate labeling and identifications were made with the aid of relevant texts (Tobor and Ajayi, 1979; Schneider, 1990; Holden and Reed, 1991) while numerical abundance of the fish species were recorded. The measurement (in centimeter) of the fishes (standard and total length), the fish girth were measured using a thread which was folded round the operculum for head girth and just before the first dorsal spines for the body girth. The thread was then stretched on the measuring board to take the girth measurement. The shrimp (carapace length) and the crab (carapace and width) species were taken using the methods described by Adetayo and Kusemiju (1994) and Chindah et al. (2000). The specimens were also weighed on a Sartorius weighing balance to the nearest gram.

The burst speed of escape, catch per unit effort and gear selectivity were determined. The durability of the outboard engine and were also determined by the use of questionnaires in the study areas. The financial analysis for the cast net operation was examined to know the economics effectiveness of the gear.

Sex determination

The gonadal developmental stages of each specimen after dissection were used to determine the sex.

Condition factor (K)

The condition factor (K) was calculated using the formula:

$$K = 100W / L^3 \quad \text{(Sturm, 1976)}.$$

Where W = weight of individual fish in grammes, L = length of the fish in centimetres.

Statistical analysis

The chi-square test was used to determine the significant difference in the numbers of species caught in day and night numbers of specimens caught by the gear.

RESULTS

Cast net design detail

The cast net was conical in shape and it has 4 panels. The sinkers were lead with 9 g weights and were attached to the foot ropes at almost regular intervals. The numbers of sinkers were 71. The net materials were monofilament nylon; polyethylene (PE) and polyester (PES), all white in colour.

The stapling distances was 90 mm and the number of meshes in stapling length of foot ropes was 6. The circumference of the net mouth was 7.92 m. The area of the net mouth was 4.99 m^2. The materials of the ropes were Kuralon 3 mm diameter and RTex values of R4351Tex. The net mesh size was 30 mm. The net mesh opening was 29 mm and the mesh circumference was 58 mm. Table 1 illustrates the design characteristics of the four panel cast net.

Total catch and catch composition

A total of one thousand, five hundred and one (1,501) specimen were collected for the four months. These amounted for 30 kg by weight as is shown in Table 2. The total catch comprised 21 fish species belonging to 16 families. *S. melanotheron* accounted for 486 (32.38%) of the total catch while *Cynoglossus sanegalensis* contributed the least number of the total catch 3 (0.20%). The penaied, *P. atlantica* accounted for 24 (1.60%) and the portunid crab, *C amnicola* contributed 10 (0.67%) of the shellfish encountered in the study.

Monthly variation in fish specimens caught by cast net

The monthly variation in fish species caught with cast net are shown in Table 3. The total numbers of specimens were 335, 101, 698 and 367 for August, September, October and November, respectively. The highest number of specimen was caught in October (698) and the least number was in September (101). *S. melanotheron* was the mostly caught species in August, September and October. *Caranx hippos* was the mostly caught species in November while the least caught species throughout the four months was *Cynoglossus senegalensis*.

Day and night variations in abundance of fish species caught with cast net

Day and night variation in abundance of fish species caught with a cast net is shown in Table 4. More number of the fish species was caught at night than in the day time. *E. fimbriata* 108 (80.60%) and *L. falcipinnis* 4 (2.99%) were the only two exceptions that were caught more in number during daytime than in the night. The chi-

Table 1. Cast net design and specification.

Panel	No of meshes		Mesh size (mm)	Mesh opening (mm)	Mesh circumference (mm)	Material
	In length	In depth				
1	60	6	30	29	58	Polyester (PES)
2	120	16	30	29	58	Nylon
3	240	12	30	29	58	Polyester (PES)
4	480	25	30	29	58	Nylon
Other design characteristic			**Measurements and description**			
Gear colour			White			
Type of Mesh net			Knotted			
Rope length; material and diameter			3.81 m; Polyethylene; 2 mm			
Rope R Tex value			R2857Tex			
Foot rope length; material and diameter			7.92m; Kuralon; 3 mm			
Foot rope R Tex value			R4351Tex			
Material of sinkers			Lead (Pb)			
Weight of sinkers			9 g			
Stapling distances			90 mm			
Number of meshes in stapling length of footrope			6			
Circumference of net mouth			7.92 m			
Length of net			1.77 m			
Area of net mouth			4.99 m^2			

Table 2. Index of abundance of cast net catch composition in Lagos Lagoon.

Family/Species	Number	Percentage (%)	Weight (kg)	Percentage (%)
Cichlidae *Sarotherodon melanotheron* (Ruppell)	486	32.38	10.677	35.56
Tilapia guineensis (Bleeker)	41	2.73	1.114	3.71
Hemichromis fasciatus (Peters)	10	0.67	0.180	0.60
Carangidae *Caranx hippos* (Linnaeus)	215	14.32	4.360	14.53
Clupeidae *Ethmalosa fimbriata* (Bowdich)	193	12.86	1.710	5.70
Sardinella maderensis (Lowe)	21	1.40	0.155	0.52
Pellonulla leonensis (Boulenger)	20	1.33	0.113	0.38
Mugilidae *Liza falcipinnis* (Valenciennes)	154	10.26	3.875	12.92
Haemulidae/Pomadasydae *Brachydeuterus auritus* (Valenciennes)	86	5.73	0.612	2.04
Pomadasys jubelini (Cuvier)	48	3.20	0.467	1.56
Bagridae *Chrysichthys nigrodigitatus* (Lacepede)	82	5.46	2.855	9.52
Elopidae *Elops lacerta* (Valencicennes)	56	3.73	1.684	5.61
Polynemidae *Polydactylus quadrifilis* (Cavier)	12	0.80	0.282	0.94
Monodactylidae *Psettias sebae* (Cuvier)	12	0.80	0.390	1.30
Sciaenidae *Pseudotolithus elongatus* (Bowdich)	8	0.53	0.175	0.58
Soleidae *Dicologoglossa cuneata* (Moreau)	8	0.53	0.036	0.12
Schilbedae *Siluranodon auritus* (Geoffrey Saint Hilaire)	8	0.53	0.197	0.66
Gobiidae *Bathygobius soporator* (Valenciennes)	4	0.27	0.256	0.85
Cynoglossidae *Cynoglossus senegalensis* (Kamp)	3	0.20	0.276	0.92
Penaeidae *Parapenaeopsis atlantica* (Balss)	24	1.60	0.451	1.50
Portunidae *Callinectes amnicola* (De Rocheburne)	10	0.67	0.135	0.45
Total	**1,501**	**100**	**30**	**100**

Table 3. Monthly variation in fish specimens of fish caught by cast net.

Species	August		September		October		November	
	No.	%	No.	%	No.	%	No.	%
S. melanotheron	119	35.52	89	88.12	240	34.38	38	10.35
C. hippos	0	0	0	0	20	2.87	195	53.13
E. fimbriata	48	14.33	0	0	33	4.73	112	30.52
L. falcipinnis	68	20.30	0	0	80	11.46	6	1.63
B. auritus	0	0	12	11.88	72	10.32	2	0.54
C. nigrodigitatus	12	3.58	0	0	66	9.46	4	1.10
E. lacerta	8	2.39	0	0	48	6.88	0	0
P. jubelini	0	0	0	0	48	6.88	0	0
T. guineensis	40	11.94	0	0	1	0.14	0	0
S. maderensis	0	0	0	0	21	3.01	0	0
P. leonensis	0	0	0	0	20	2.87	0	0
P. quadrifilis	0	0	0	0	8	1.15	4	1.10
P. sebae	4	1.19	0	0	8	1.15	0	0
H. fasciatus	8	2.39	0	0	0	0	2	0.54
P. elongatus	0	0	0	0	8	1.15	0	0
D. cuneata	0	0	0	0	8	1.15	0	0
S. auritus	8	2.38	0	0	0	0	0	0
B. soporator	4	1.19	0	0	0	0	0	0
C. senegalensis	0	0	0	0	1	0.4	2	0.54
P. atlantica	8	2.39	0	0	16	2.29	0	0
C. amnicola	8	2.39	0	0	0	0	2	0.54
Total	**335**	**100**	**101**	**100**	**698**	**100**	**367**	**100**

square test showed a significant difference in the number of fish species caught at night and daytime by a cast net.

Monthly variation in daytime and night fish specimens caught with cast net

S. melanotheron was the only fish caught during daytime 5 (100%) and night 84 (100%) in September. Only one specimen of *C. senegalensis* was caught during daytime in October and it was mostly caught at night 64 (21.1%) in the same month. More specimens of *S. melanotheron* 8 (40%), *C. nigrodigitatus* 4 (20%), *P. quadrifilis* 4 (20%) and *L. falcipinnis* 4 (20%) were caught at daytime in November than at night in the other months. Monthly variation in daytime and night fish specimens is shown in Table 5.

Fishing trips, duration and number of specimens caught by cast net

Eleven (11) cast net fishing trips were carried out during the study period. The total number of casts during the 11 trips was 247 for duration of 38.7 h (Table 6). A total of 1,501 specimens of fish were caught in all. The highest average catch was recorded for October (10.74) and the least catch was observed for August (3.76). The highest hours used for casting was 14 h in October and the least casting period was 6.5 h (August).

Catch per unit effort (CPUE)

The average number of fish caught with cast net per trip was 138. The average number of fish caught per hour was 39. The average number of fish caught per cast was 6 and the average number of cast per hour was 6.

Length-weight distribution of fishes

The variation in lengths and weights of the 21 fish species caught were represented in Table 7.
The smallest size recorded was in shell-fish *C. amnicola* which was 2.3 (4.59 g). For the fin-fish the smallest size of 5.1 cm (2.96 g) was recorded in *S. melanotheron*. The highest sized specimen was *C. senegalensus* 21 – 36.3 cm. The smallest weight was recorded in *T. guineensis* (2.04 g) while the highest weight of 320.55 g was recorded in *C. nigrodigitatus*.

Condition factor (K)

The cast net fin-fish least condition factor was found in *C. senegalensis* (0.26) while the highest condition factor was found in *P. sebae* (3.0). The fin-fish mean condition factor was 1.11. The crustacean *C. amnicola* had the highest condition factor with a range of 37.7 – 59.7 and a mean of 49.04.

Table 4. Day and night variations in abundance of fishes caught with cast net in Lagos lagoon.

Species	Day time		Night	
	Number	Percentage (%)	Number	Percentage (%)
E. fimbriata	108	80.60	36	8.53
S. melanotheron	13	9.7	130	30.09
C. nigrodigitatus	4	2.99	64	14.81
C. senegalensis	1	0.75	2	0.46
P. quadrifilis	4	2.99	8	1.85
P. elongatus	0	0	8	1.85
E. lacerta	0	0	48	11.11
B. auritus	0	0	50	11.57
P. sebae	0	0	8	1.85
D. cuneata	0	0	8	1.85
P. jubelini	0	0	16	3.70
L. falcipinnis	4	2.99	2	0.46
H. fasciatus	0	0	2	0.46
P. atlantica	0	0	16	3.70
C. amnicola	0	0	2	0.46
Total	**134**	**100**	**432**	**100**

Table 5. Monthly variation in daytime and night fish specimen caught with cast net in Lagos lagoon.

Species	September				October				November			
	Daytime		Night		Daytime		Night		Daytime		Night	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
S. melanotheron	5	100	84	100	0	0	16	5.3	8	40	30	78.9
C. senegalensis	0	0	0	0	1	100	64	21.1	0	0	2	5.3
C. nigrodigitatus	0	0	0	0	0	0	0	0	4	20	0	0
P. quadrifilis	0	0	0	0	0	0	8	2.6	4	20	0	0
P. elongatus	0	0	0	0	0	0	8	2.6	0	0	0	0
E. fimbriata	0	0	0	0	0	0	32	10.5	0	0	0	0
E. lacerta	0	0	0	0	0	0	48	15.8	0	0	0	0
B. auritus	0	0	0	0	0	0	48	15.8	0	0	0	0
P. sebae	0	0	0	0	0	0	8	2.6	0	0	0	0
D. cuneata	0	0	0	0	0	0	8	2.6	0	0	0	0
P. jubelini	0	0	0	0	0	0	48	15.8	0	0	0	0
L. falcipinnis	0	0	0	0	0	0	0	0	4	20	2	5.3
H. fasciatus	0	0	0	0	0	0	0	0	0	0	2	5.3
P. atlantica	0	0	0	0	0	0	16	5.3	0	0	0	0
C. amnicola	0	0	0	0	0	0	0	0	0	0	2	5.3
Total	**5**	**100**	**84**	**100**	**1**	**100**	**304**	**1**	**20**	**100**	**38**	**100**

Total landing by weight and price of fishes caught with cast net

30.00 kg of cast net fish specimens were caught at a price of ₦ 4,500 (USD 32.14) that is N150 (USD 1.07) per kilogram of fish. With 11 cast net trips, the price of fish caught per trip was ₦230.91 (USD 1.65) (Table 8).

Cast net selectivity

The circumference of the three cast nets meshes used

Table 6. Fishing trips, duration and number of specimens caught in Lagos lagoon.

Month	No. of trip	No of fish caught	No. of cast	Duration (h)	Average specimens per cast
August	2	335	89	6.5	3.76
September	2	101	16	4.7	6.31
October	4	698	65	14.0	10.74
November	3	367	77	13.5	4.77
Total	**11**	**1501**	**247**	**38.7**	**6.08**

Table 7. Variation in sizes and weight of fishes caught with cast net in Lagos lagoon.

Species	Total length size range (cm)	Weight range (g)
S. melanotheron	5.1 – 18.0	2.96 – 81.84
T. guineensis	5.3 – 15.3	2.04 – 66.82
H. fasicatus	8.7 – 11.9	10.01 – 24.74
S. maderensis	9.1 – 10.5	7.14 – 11.74
P. leonensis	8.80 (1)	5.65 (1)
C. nigrodigitatus	10.5 – 35.1	8.5- 320.55
P. sebae	6.4 – 14.0	7.7 – 82.18
B. soporator	17.0 (1)	63.89 (1)
E. fimbriata	6.6 – 14.6	3.86 – 24.04
C. senegalensis	21.0 - 36.3	25.9 – 125.2
B. auritus	7.1 – 12.5	3.93 – 19.45
P. jubelini	8.1 – 11.5	5.94 – 19.20
L. falcipinnis	8.1 – 26.2	4.82 – 123.2
E. lacata	10.2 – 25.3	4.62 – 88.6
C. hippos	9.4 – 14.2	10.90 – 37.45
D. cuneata	9.1 (1)	4.55 (1)
P. elongatus	15.3 (1)	21.83 (1)
S. auritus	14.0 – 16.8	17.95 – 31.40
P. atlantica	7.7 – 12.9	5.17 – 27.99
C. amnicola	2.3 – 3.5	4.59 – 25.60

Table 8. Total landing by weight and price of fishes caught with cast net in Lagos lagoon.

Month	Weight (kg)	Price (₦)	Price (USD)
August	9.3044	1395.65	2.02
September	1.885	282.75	2.02
October	12.04	1805	12.89
November	6.776	1016.4	7.25
Total	30.00	4500	32.14
Price per Kg (₦)		150	1.07

ranged between 48 mm and 62 mm. The body girths of all of the specimens ranged between 4.7 mm and 123 mm. With the conventional hanging ratios, the fishes having body girths smaller than the circumferences of the net meshes they contact can escape. In one fishing trip, using a cast net with a mesh circumference of 48 mm, the fishes caught had body girths ranging from 4.7 mm to

34 mm. In another trip with the same net, the body girth of the fishes caught ranged between 5.2 mm and 13.7 mm. The fishes had body girths smaller than the meshes circumferences could not escape because during operation the hanging ratio of the cast nets was very small.

The cast net was selective for shallow water species. The depths operated on, ranged from 0.45 m to 5.49 m. On burst speed of escape, the fishes were frightened when the cast net hit the water surface, the smallest fish caught, S. melanotheron, had a total length of 5.1 cm and would have a maximum burst speed of 51 cm per second. S. melanotheron was caught at a depth of 1.22 m. The longest fish caught was L. falcipinnis of 26.2 cm total length at a depth of 2.13 m. L. falcipinnis had a maximum burst speed of 262 cm per second. It was assumed that the two fishes were at one end of the diameter of the net mouth, S. melanotheron with a burst speed of 0.51 cm (51 cm) per second would spend 34.71 s to reach the other end of the diameter and L. falcipinnis with burst speed of 2.62 m (262 cm) per second would

spend 6.76 s to reach the end of the diameter. The selectivity of cast net as regards the burst speeds of fishes, depend on: the size of the fish, the direction the fish tries to escape, the area or diameter of the net mouth, the depth of the water and the depth at which the fish is dwelling, and the sinking speed of the cast nets. The cast net was damaged when used on rough ground with pegs or wrecked boats.

Financial analysis of cast net operation

The cost of inputs (canoe, outboard engine, paddle, net and its rigging, pole and anchor) or total cost of investment ranged from ₦3500 to ₦200, 260 between 1981 and 2005. The cost of rigging cast nets had a range of ₦ 2400 – ₦7,460. Output cost was calculated to be ₦818.16 per trip. It was assumed that if fishing was done for 365 times in a year, the annual income would be ₦298, 628.4 (USD 1990.86).

With good maintenance, the durability of the nets ranges from 3 months to 3 years (Azeez, 1997). The durability of the outboard engine ranges from 5 years to 6 year, the durability of the canoes ranged from 10 years to 15 years. All the fishermen interviewed readily stated that cast netting was profitable and that they were satisfied with job. Cast net caught too many juveniles fishes (5.1, 5.3, 6.4 cm) in total length. Biologically, cast nets are uneconomical.

DISCUSSION

The netting material used for constructing the cast nets used in Lagos lagoon were monofilament nylon, polyethylene (PE) and polyester (PES). They were of high standards, and of good qualities. The conventional ratio 1:2 of the number of meshes in the length of the first or apical panel to the second was not adopted by the fisherman. This disagreed with the report of Von Brandt (1984) and Udolisa and Solarin (1979) in Germany and Lagos lagoon, respectively, that to attain the right shape, the cast nets are carefully constructed. The design had no effect on the catches as observed with comparison with fishermen catches.

Twenty-one fish species belonging to 19 families were caught, fourteen of the species were among the 16 species caught in the lagoon throughout the year as reported by Fagade and Olaniyan (1974) and Solarin (1998) in the Lagos lagoon. In comparison to Fagade and Olaniyan (1974) and Solarin (1998) low species was recorded in this study. Low species diversity observed may be a reflection of gear type used. This agreed with Emmanuel and Kusemiju (2005) in cast net used in a brackish water pond. *S. melanotheron* was numerically most abundant in Lagos lagoon. This agreed with the report of Solarin (1998) in Lagos lagoon. This may be that the environment favours both the physiology and the general biology of the species.

The highest catch was reported for October (698) this could be related to the wellbeing of the fish around this time in relation to availability of food and environmental favourability, since nutrients are flushed from inland and the storm waters during this time (rainy season) as reported by Nwankwo (2004). This could also be as a result of the choice location for casting. *S. melanotheron* was the most common species throughout the months. This revealed that it is a euryhaline species. *Caranx hippos* was most abundant in November. This was supported by Schneider (1990) who reported that it was an estuarine species.

Numerically, more fish specimens were caught at night than in the daytime. This agreed with Udolisa and Solarin (1979) in Lagos lagoon but disagreed with Emmanuel and Kusemiju (2005) in cast net catches in a brackish water pond. This could be attributed to changes in light intensity and night fishing should be more productive in this type of lagoon fishery for the local fishermen.

S. melanotheron was common both at night and daytime. This showed that it could be caught at night any time irrespective of the period of the day. The species abundance was low in the lagoon compared to Fagade and Olaniyan (1974) and Solarin (1998) in the same lagoon. The lowering of fish diversity is a good indicator of a stressed ecosystem (Leveque, 1995) and it is commonly agreed that the higher the fish diversity, the more stable the fish community as reported by Albaret and Lae (2003).

This study showed that the higher the effort the more catch but on the contrary Emmanuel and Kusemiju (2005) reported that cast net catches in the pond majorly was dependent on the tidal level.

The more the cast net throws the more the catch. This disagreed with the report of Emmanuel and Kusemiju (2005) where it was reported that only two cast can give a total representatives of the species in the pond. The overall length size of the fish caught in the lagoon showed that most sizes groups are represented in the lagoon. This also implied that, most of these species were resident in the lagoon especially *S. melanotheron, T. guineensis, H. fasciatus, C. nigrodigitatus, E .lacerta, P. sebae* and *E. fimbriata.*

The overall condition factor for the species indicated that the species are not healthy but singly, *P. sebae* extremely health and favoured by the lagoonal environmental factors. The crustaceans (*C. amnicola* and *P. notialis*) had higher condition factor, this reflected their feeding and their adaptability to the lagoon environment.

The total landing for cast net was small compared to what was reported by Solarin (1998). This may be that the fishing was done at the right time (low tide) as reported by Emmanuel and Kusemiju (2005). In view of the capital required to construct the gear and canoe, cast net fishery was not encouraging with the financial output of ₦ 818.16 per fishing trip.

The cast net caught large array of species (21 species)

of fish indicating that it was not species specific. With the conventional hanging ratios, the fishes having body girths smaller than the circumferences of the net meshes they contacted can escape.

The cast net was selective for shallow water specimens. This was as a result of burst speed of escape of the fishes that was aggravated by the shallowness of the water in relation to the volume of water available for the fishes. This agreed with the report of Gupta and Gupta (2006) in the collection of larvivorous fishes.

The burst speed of escape of *S. melanotheron* and *L. falcipinnis* gave an assumption that the two fishes were at one end of the net mouth diameter, then the later with a burst speed of 0.51 m (51 cm) per second would spend 34.71 s to reach the other end of the diameter and the former with burst speed of 2.62 m (262 cm) per second would spend 6.76 s to reach the other end of the diameter. The selectivity of cast net with regards to the burst speed of fishes depends on: the size of the fish, the direction the fish tries to escape, the area or diameter of the net mouth, the depth of the water, the depth at which the fish is dwelling and the sinking speed of the cast net. All these characteristics are important for the cast net efficiency and fisheries management in the lagoon.

Cast net were easily destroyed in the rough surface bottom with stumps and wreck boats. So, cast net durability depends on the preservation and the nature of the area where they are used.

The annual income for 365 days (a year) was estimated at ₦ 298, 628.2 (USD 1990.85). Compared to the cost of investment, it means that a profit of ₦ 98, 368.4 (USD 702.63) will be made if outboard engine was used. Then, it will be advisable to use cast net without outboard engine for more profit since the use of outboard engine has not been confirmed to increase the cast net yield.

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