Development of Semiballoon Trawl for Shrimp

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Two semiballoon trawls, one of 22 m and the other of 33 m in head rope length, were developed for catching shrimp effectively from the inshore waters off southwest coast of India. The 22 m semiballoon trawl landed 25% shrimp while 33 m semiballoon trawl landed only 15% shrimp in the total catch. Species-wise catch analysis showed significant variations in the composition at different depths.

Key words: Semiballoon trawl, shrimp

Trawls have been found selective in catching certain species. Laurent Wantiez (1996) gave a comparison of composition of fish in a shrimp trawl and fish trawl in St. Vincent Bay, New Caledonia. Shrimp trawls have been constructed as balloon type or semi balloon type with a wide funnel shaped mouth and body tapering at throat and cod end. Mesh size is small when compared to fish trawls. Varghese *et. al.* (1968) reported that bulged belly trawls are more effective in catching shrimp and small shallow water mix off Cochin. Deshpande *et. al.* (1970) studied the suitability of six seam trawl off Veraval. Northwest coast of India. Kunjipalu *et. al.* (1979) studied comparative efficiency of a 25 m bulged belly trawl and a six seam trawl of the same head rope length on the Northwest coast.

Two semiballoon trawls (SBT), one with 22 m head rope and the other with 33 m headrope, were designed, constructed and field tested off Cochin to study their efficiency in catching shrimp. Results are presented in this paper.

Materials and Methods

Fig. 1 shows the design and construction details of 22 m semiballoon trawl. Details of 33 m semiballoon trawl are shown in Fig. 2. The 22 m trawl was operated from MFB Sagar Shakti. a medium class wooden vessel of 15.2 m OAL with 220 BHP. The 33 m semiballoon trawl was operated from MFV Matsyakumari, a steel trawler of 17.5 m OAL with 278 BHP. Both nets were operated with V form steel otter boards of 1500 mm x 890 mm weighing 150 kg described by Kunjipalu *et. al.* (1984), using 20 m double bridles on either side. Each haul of 45 min to 1 h 15 min was made in shallow waters, 8-30 m depth. off Cochin.
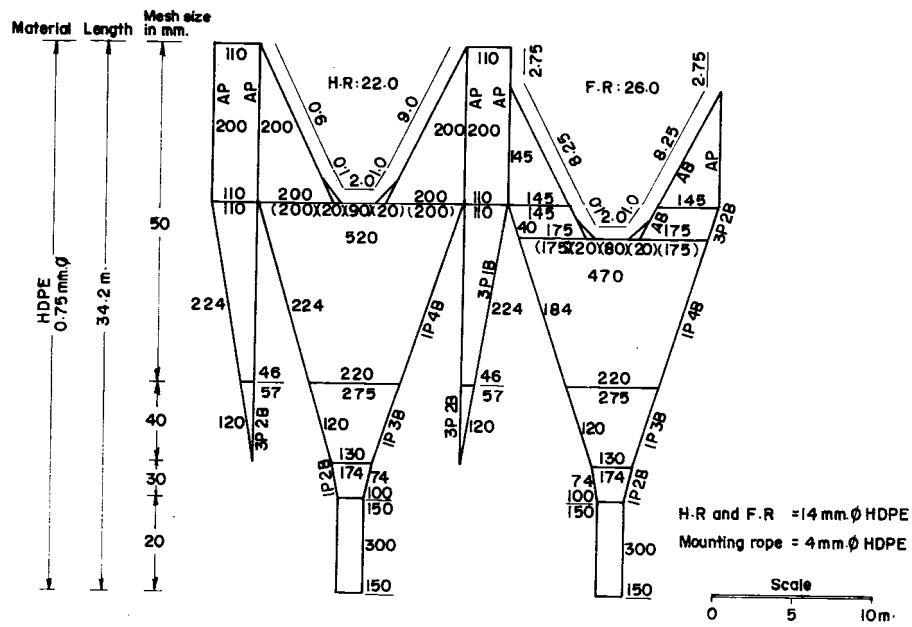
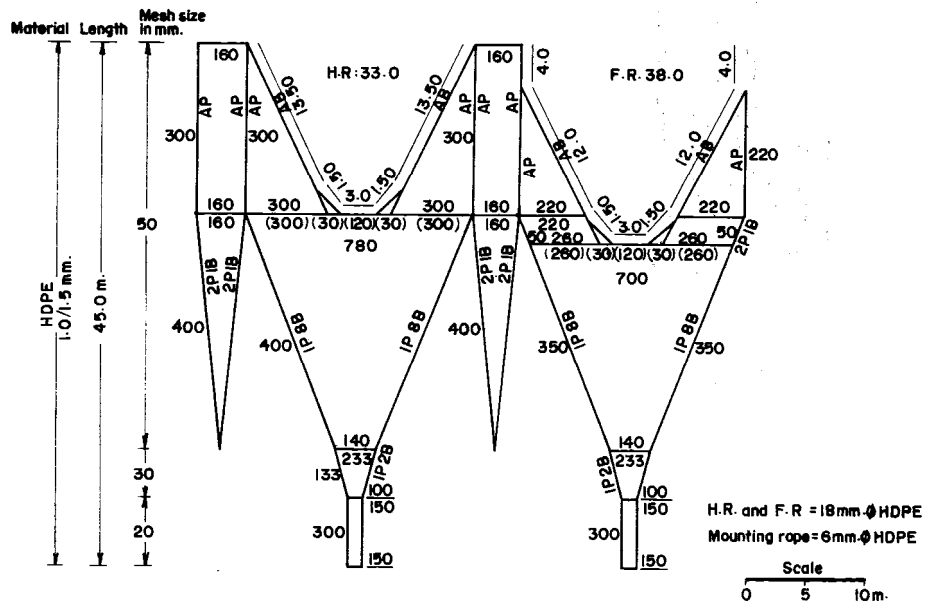Fig. 1. Design details of 22 mm semi-balloon trawl

Fig. 2. Design details of 33 mm semi-balloon trawl

Results and Discussion

A total of 70 hauls with 70 h of fishing effort were made by 22 m semiballoon trawl (during 15-11-1993 to 17-5-1996) and landed 840 kg fish with an average catch of 12 kg/h (Table 1). The 33 m trawl yielded 1528 kg with an average of 20.6 kg/h through 79 hauls in 74 h of fishing effort during 13-5-1993 to 12-7-1996 (Table 2). Composition of catch is given in Tables 1 and 2. Results of statistical analysis are shown in Table 3.

Table 1. Particulars of operation and catch of 22 m semiballoon trawl

Fishing effort	70 hauls/70hrs	
Period of investigation	15-11-1993 - 17-5-1996	
Name of vessel	MFB Sagar Shakti	
Total catch	840 kg	
CPUE	12.00 kg	
Composition of catch		
Item	Weight, kg	Percentage
Shrimp	210.5	25
Quality fish	59.5	7
Anchovy	73.5	9
Sciaenids	215.5	26
Silverbelly and carangids	81.5	10
Cephalopods	9.0	1
Miscellaneous	190.5	22
Total	840.0	100

Table 2. Particulars of operation and catch of 33 m semiballon trawl

Fishing effort	79 hauls/74 h	
Period of investigation	13-5-1993 - 12-9-1996	
Name of the vessel	MFB Matsyakumari	
Total catch	1528 kg	
CPUE	20.6 kg	
Composition of catch		
Item	Weight, kg	Percentage
Shrimp	254.5	17
Quality fish	187.5	12
Anchovy	126.0	8
Sciaenids	206.5	14
Silverbelly and caragids	85.5	5
Cephalopods	9.0	0.5
Miscellaneous	659.5	43.5
Total	1528.0	100

Table 3. Student 't' test results

	Depth	33 m	22 m	't'	Remarks	dt
Total catch	5-10	42.20	19.06	0.202	NS	33
	10-15	24.83	14.59	1.71	NS	66
	15-20	24.53	9.00	1.83	NS	23-
	20-25	23.57	11.35	2.40	p<0.05	15
Quality fish	5-10	1.60	0.25	2.32	p<0.05	32
	10-15	2.50	1.43	1.46	NS	57
	15-20	1.56	1.00	0.88	NS	24
	20-25	2.43	0.60	2.56	p<0.05	15
Anchovy	5-10	0.55	0.78	0.49	NS	33
	10-15	2.04	1.48	0.87	NS	64
	15-20	1.37	0.56	1.10	NS	25
	20-25	2.43	0.95	2.55	p<0.05	15
Shrimp	5-10	2.77	5.56	3.06	p<0.05	34
	10-15	2.07	1.69	0.53	NS	64
	15-20	5.61	1.00	1.10	NS	24
	20-25	6.57	2.06	2.22	p<0.05	14
Silverbelly	5-10	1.55	0.12	0.37	NS	23
	10-15	1.46	0.91	1.58	NS	65
	15-20	0.44	0.36	0.12	NS	23
	20-25	0.00	0.55	3.44	p<0.05	16
Sciaenids	5-10	8.30	2.86	1.71	NS	23
	10-15	2.55	3.30	0.68	NS	65
	15-20	1.03	2.19	1.50	NS	24
	20-25	0.00	3.75	2.02	NS	15
Miscellaneous	5-10	9.00	23.70	2.69	p<0.05	33
	10-15	4.40	13.67	2.66	p<0.05	88
	15-20	3.57	17.67	2.67	p<0.05	8
	20-25	9.57	3.06	2.57	p<0.05	13

For comparing the catching efficiency of the two nets student 't' test was employed. Catch-wise and depth-wise analyses are presented in Table 3. The following conclusions are drawn from the results.

- Total catch showed significant difference (p<0.05) only in 20-25 m depth range. The average catch of 33 m SBT was significantly higher than that of 22 m net

- Quality fishes differ significantly in the two nets (p<0.05) at 5-10 m depth and 20-25 m depth range. The catch of 33 m net was significantly higher in both the depths.

- Anchovy catch was significantly higher in 33 m SBT in the depth range 20-25 m.

- Catch of shrimp were significantly higher (p<0.05) in 22 m net in the depth range 5-10 m while in the depth range 20-25 m. the catch was significantly higher in 33 m net.

- Significantly higher catch (p<0.05) of silver belly was observed in 22 m net in the depth range 20-25 m.

- Catch of sciaenids showed no significant difference between nets in all the 4 depths.

- Miscellaneous catch was significantly higher (p<0.05) in 22 m net in all depth ranges.

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