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COMPARATIVE ANALYSIS OF MARINE GILLNETS OF SINDHUDURG DISTRICT, MAHARASHTRA

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ABSTRACT : Gill net fishing is one of the popular fishing methods along the west and east coast of India. However, there are regional variations in their design, specifications and operation. This paper deals with the design and general characteristics of marine gill nets operated from Sindhudurg district of Maharashtra. For capture of mackerel, whitefish, seer fish, pomfret, shrimp and red snapper in Sindhudurg, gill nets were made up of PA monofilament and PA multifilament material and its mesh size varied between 46 to 200 mm and hanging coefficient from 0.40 to 0.58. The hung length and hung depth of marine gill nets of Sindhudurg were 30 to 124 m and 4.08 to 15.21 m, respectively.

Key words : Design, specifications, marine gill net.

INTRODUCTION

Maharashtra is one of the major marine fish landing states in India. It has 720 km coastal line spread over five maritime districts *viz.* Thane, Mumbai and suburban, Raigad, Ratnagiri and Sindhudurg. Total marine fish production of Maharashtra during the year 2015-16 was 4.3 lakh tonnes. In Maharashtra, 13002 mechanized vessels and 2714 non mechanized vessels were engaged in fishery. Fish production by gill net with mechanized vessels was 35307 tonnes and non-mechanized vessels were 1187 tonnes. The Sindhudurg district contributed 17699 tonnes i.e. 3.9% in the annual production of the Maharashtra state (Fish Production Report, 2015-16).

Sindhudurg district has 121 km coast line with 1503 mechanized vessels and 698 non non-mechanized vessels engaged in fishery. In the year 2015-16, fish production by gill nets with mechanized vessels was 6439 tonnes and by non-mechanized vessels recorded was 581 tonnes (Fish Production Report, 2015-16). Traditional craft and gears play a significant role in Sindhudurg fisheries along the coast.

Many changes have taken place in the gillnets with respect to the material used, net dimensions, mesh size, mode of operation (Vijayan *et al*, 1993) etc. The present day gill nets are mostly resource specific. The present study is an attempt on the comparative analysis of the technical characteristics of marine gillnets operated from Sindhudurg district, Maharashtra.

METHODOLOGY

Sindhudurg district is located in the southern part of Maharashtra and comprises of three coastal Taluka namely Devgad, Vengurla and Malvan. Interview schedule was prepared in proper way to collect required information to satisfy the objectives of the present study. Structured data collection schedule formulated for the present study comprised of two major sections. The first section dealt with the particulars of gill net owner and the fishing vessel used for gill net operation. The second section deals with the technical specifications design aspects, rigging and the mode of operation of the marine gill nets used by the fisherman of Sindhudurg district. The information included in the first section was recorded according to Kazi *et al* (2010) whereas; the information in the second section was physically collected and recorded according to Pravin *et al* (2009).

RESULTS AND DISCUSSION

A comparative analysis of the detailed technical characteristics of the five types of marine gill nets, namely Mackerel, Whitefish, Seer fish, Pomfret gill net and Shrimp trammel net obtained during the present study and reported by the researchers over the years along the Indian coast, are presented in the Tables 1, 2, 3, 4, and 5; respectively. In Sindhudurg, four drift gill nets and one bottom set gill net were found in operation along the coast.

PA monofilament and PA multifilament material used for marine gill nets and its mesh size varied between 46 to 200 mm with hanging coefficient from 0.40 to 0.58. Mostly drift gill nets were operated in surface and column waters whereas set gill nets operated at bottom waters according to movement of targeted species from

Table 1 : Comparative analysis of Mackerel gill nets along the West and East coast of India.

Sr. No.	Author	Location/ Place of operation	Method of operation	Type of twine used for webbing	Color of webbing	Twine diameter (mm)	Mesh size (mm)	Hanging coefficient	Hung length (m)	Hung depth (m)
West Coast										
1.	**Present study**	**Sindhudurg (Maharashtra)**	**Surface and Mid-column**	**PA Monofilament**	**Colourless and light green**	**0.16-0.28**	**46-56**	**0.40-0.55**	**30-60**	**4.08-12.2**
2.	Pravin *et al* (1998)	Gujarat	-	PA Monofilament	-	0.28-0.30	40-70	-	-	-
3.	Kazi *et al* (2010)	Ratnagiri (Maharashtra)	Surface and column	PA Monofilament	Colourless	0.23	45-60	0.40-54	38.88-76.92	4.50- 5.69
4.	Kazi *et al* (2012)	Ratnagiri (Maharashtra)	Surface and column	PA Monofilament	Colourless	0.20-0.23	52-56	0.41-0.54	60.35-84.67	8.28-17.62
5.	Mathai *et al* (1993)	Goa	-	Nylon	-	210d×1×2	190-200	-	-	-
6.	Thomas *et al* (2005)	Karnataka	-	PA Monofilament	-	0.20	50-65	-	-	-
7.	Satyanarayana and Sadanandan (1962)	Kerala	-	Multifilament	-	20/3/1 & 20/4/1	50.8	0.46-0.56	-	11.48-13.1
8.	Vijayan *et al* (1993)	Kerala	-	-	-	-	50-52	-	-	9-18.9
9.	Thomas *et al* (2005)	Kerala	-	PA Monofilament	-	0.16-0.32	-	-	-	-
10.	Thomas and Hridayanathan (2006)	Kerala	-	PA Monofilament	-	0.20	38-52	0.62	160	8.48
East Coast										
1.	Ramarao *et al* (2002)	Andhra Pradesh	-	PA Multifilament	-	210d×1×2	50-60	0.50-0.55	70-800	7-9.6
2.	Thomas *et al* (2005)	Andhra Pradesh	-	PA Multifilament	-	210d×1×2	-	-	-	-

Table 2 : Comparative analysis of whitefish gill nets along the West coast of India.

Sr. No.	Author	Location/ Place of operation	Method of operation	Type of twine used for webbing	Color of webbing	Twine diameter (mm)	Mesh size (mm)	Hanging coefficient	Hung length (m)	Hung depth (m)
West Coast										
1.	**Present study**	**Sindhudurg (Maharashtra)**	**Surface, column**	**PA Monofilament**	**Colourless**	**0.20-0.23**	**46-48**	**0.40-0.55**	**108-124**	**8.21-15.21**
2.	Thomas and Hridayanathan (2006)	Kerala		PA Multifilament	-	210d×1×2	33-35	0.71	114	5.13

Table 3: Comparative Analysis of Seer fish gill nets along the West and East coast of India.

Sr. No.	Author	Location/ Place of operation	Method of operation	Type of twine used for webbing	Color of webbing	Twine diameter (mm)	Mesh size (mm)	Hanging coefficient	Hung length (m)	Hung depth (m)
West Coast										
1.	**Present study**	**Sindhudurg (Maharashtra)**	**Surface and Column**	**PA Multifilament**	**Green**	**210d×6×3-210d×12×3**	**90-140**	**0.40-0.58**	**51-90**	**8.07-12.11**
2.	Pravin *et al* (1998)	Gujarat	-	PA Multifilament	-	210d×2×3	40-140	-	-	-
3.	Kazi *et al* (2012)	Ratnagiri (Maharashtra)	Surface drift	PA Multifilament	Dark green and brown	210d×2×3-210d×12×3	70-150	0.40-0.67	21-82	6.63-11.74
4.	Khatavkar *et al* (2016)	Satpati (Maharashtra)	Column set	PA Multifilament	Green and red	210d×3×3-210d×4×3	90-100	0.32-0.35	40-45	14
6.	Thomas *et al* (2005)	Karnataka	-	PA Multifilament	-	210d×6×3	-	-	-	-
7.	Vijayan *et al* (1993)	Kerala	-	PA Multifilament	-	210d×6×3	100-120	-	-	7-15.1
8.	Thomas and Hridayanathan (2006)	Kerala	Column or surface	PA Multifilament	-	210d×6×3	70-140	0.44-0.71	53	9.28
East Coast										
1.	Sitarama Rao *et al* (1980)	Andhra Pradesh	-	PA Multifilament	Blue, green, white and yellow	-	-	-	-	-
2.	Ramarao *et al* (2002)	Andhra Pradesh	-	PA Multifilament	-	210d×1×3-210d×12×3	-	-	25-720	5.5-12
Andaman and Nicobar										
1.	Thomas *et al* (2005)	Andaman Island	-	PA Multifilament	-	210d×2×3	-	-	41.25-108.57	6.63-11.74

Table 4 : Comparative analysis of Pomfret gill nets along the West and East coast of India.

Sr. No.	Author	Location/ Place of operation	Method of operation	Type of twine used for webbing	Color of webbing	Twine diameter (mm)	Mesh size (mm)	Hanging coefficient	Hung length (m)	Hung depth (m)
West Coast										
1.	**Present study**	**Sindhudurg (Maharashtra)**	**Surface and column drift**	**PA Monofilament**	**Light green and colourless**	**0.23-0.32**	**115-125**	**0.41-0.56**	**50-55**	**8.15-9.20**
2.	Kunjipalu *et al* (1984)	Veraval (Gujarat)	-	-	White, blue, green, yellow, orange and brown	-	-	-	-	-
3.	Mohan Rajan and Mathai (1988)	Saurashtra coast (Gujarat)	-	-	White and yellow	-	-	-	-	-
4.	Pravin *et al* (1998)	Gujarat	Surface, column and bottom drift	PA Monofilament	-	-	80-120	-	-	-
5.	Ghosh (2009)	Veraval (Gujarat)	Bottom drift	-	-	-	100-160	-	-	-
6.	Kazi *et al* (2010)	Ratnagiri (Maharashtra)	Surface, column set	PA monofilament	-	0.23-0.32	100-130	0.41-0.56	47-108	4.41-11.92
7.	Khatavkar *et al* (2017)	Satpati (Maharashtra)	Surface, column set	PA monofilament	White, blue and green	0.23-0.28	130-140	0.30-0.36	120-140	7- 8
8.	Thomas *et al* (2005)	Karnataka	-	PA multifilament		210d×9×3	110-115	-	-	-
9.	Panicker *et al* (1978)	Kerala	-	-	-	-	126	0.60	-	-
10.	Vijayan *et al* (1993)	Kerala	-	PA monofilament	-	0.23	100-120	-	-	6.5-9.5
11.	Thomas and Hridayanathan (2006)	Kerala	-	PA monofilament	-	0.20	100-118	0.45-0.62	160	8.83
East Coast										
1.	Sitarama Rao *et al* (1980)	Andhra Pradesh	-	-	White, blue, green and yellow	-	-	-	-	-
2.	Ramarao *et al* (2002)	Andhra Pradesh	Surface set	PA monofilament	-	0.23-0.32	120-150	0.50-0.65	27-1260	5.5–10
3.	Thomas *et al* (2005)	Tamil Nadu	-	PA multifilament	-	210dx1x2	140-280	-	-	-

Table 5 : Comparative analysis of Shrimp Trammel nets along the West and East coast of India.

Sr. No.	Author	Location/ place of operation	Method of operation	Type of twine used for webbing		Color of webbing	Twine diameter (mm)		Mesh size (mm)		Hanging coefficient		Hung length (m)	Hung depth (m)
				Inner	Outer		Inner	Outer	Inner	Outer	Inner	Outer		
West Coast														
1.	**Present study**	**Sindhudurg (Maharashtra)**	**Bottom set**	**PA Monofilament**	**PA Multifiament**	**Colourless**	**0.16-0.20**	**210× 2×3**	**46-48**	**240-250**	**0.42-0.49**	**0.64-0.79**	**90**	**6.9-9.05**
2.	Kazi *et al* (2011)	Ratnagiri (Maharashtra)	Bottom set	PA Monofilament	PA Multifiament	Colourless	0.16	210× 2×3	45-50	250-280	0.42-0.49	0.61-0.79	31.64-61.82	5-6.21
3.	Vijayan *et al* (1993)	Kerala	Bottom set	-	-	-	-	-	40-48	240-250	-	-	-	2.5-3.5
4.	Thomas and Hridayanathan (2006)	Kerala	Bottom set	PA Multifilament	PA Multifilament	-	210d x1x2	210d x3x3	45	260	0.42	0.71	-	3.42
5.	Thomas *et al* (2005)	Kanyakumari (Tamil nadu)	-	PA Multifilament	PA Multifilament	-	Rtex 51	Rtex 152	40	270	0.55	0.63	-	-
East Coast														
1.	Naidu *et al* (1985)	Orissa	-	-	-	-	-	-	-	-	0.50	0.80	-	-
2.	Ramarao *et al* (2002)	Andhra Pradesh	Bottom Set	PA Multifilament	PA Multifilament	-	210d x1x2	210d x3x3	50	250	0.50	0.70	46-80	3-3.50
Andaman and Nicobar														
1.	Thomas *et al* (2005)	Andaman island	-	PA Multifilament	PA Multifilament	-	210d x1x2	210d x2x3	20-34	250	-	-	-	-

mechanized or motorized fishing vessels.

In the present study, it was observed that, fishing vessels ranging from 15 ft (4.45 m) to 35 ft (10.40 m) in overall length (LOA) were used for marine gill net fishing operations. These included wooden plank built canoe with or without outrigger, wooden vessel, fibber reinforced plastic (FRP) coated wooden vessels and FRP vessels. FRP coated or pure FRP vessels in the motorized sector were fitted with outboard engines of 9.9 hp and the mechanized sector comprised of wooden plank built or FRP boats fitted with inboard diesel engines of 16 to 99 hp. Single day gill net fishing operations with 2 to 3 persons onboard motorized vessels and 4 to 5 crew members on mechanized vessels was commonly practiced in Sindhudurg.

CONCLUSION

The documented information on the technical specifications and design of marine gill nets of Sindhudurg district of Maharashtra, would serve as a base line information for the technological modifications the gear may undergo to increase their efficiency in the coming years.

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