



Design and Technical Specifications of Seer Fish Gillnets of Ratnagiri, Maharashtra

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Abstract

Gillnet is commonly used by the fishermen of Ratnagiri for the capture of seer fish. The present study deals with design, technical specifications and operation of seer fish gillnets (*towerchi rapan*) operated off Ratnagiri, Maharashtra. The nets were made of webbings of polyamide multifilament of 210d×2×3 to 210d×12×3 having mesh sizes ranging from 70 to 150 mm. Each fleet of net comprised of webbings of different mesh sizes in combination to capture different size groups of fishes, which is not a good practice. The nets were without foot ropes and were operated as surface drift during September to December and column drift during October to May. The seer fish gillnet fishing sector of Ratnagiri comes under the category of 'small scale drift net fisheries' as fleet length of majority of the units was below 2500 m.

Key words: Design, seer fish, gillnet, polyamide multifilament

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Introduction

Gillnets, owing to their simplicity in design, construction and operation and low investment, remain as the most popular gear especially in the traditional sector. Maharashtra, one of the major maritime states of India has 720 km of coast line spread over five maritime districts viz. Thane, Mumbai, Raigad, Ratnagiri and Sindhudurg. In Ratnagiri, a total of 588 gillnetters were in operation

(Anon, 2007). Design and general characteristics of marine gillnets of Kerala have been discussed by Vijayan et al. (1993) and Thomas & Hridayanathan (2006). The gillnets of Sundarbans were described by Banerjee & Chakrabarthy (1972), those of Gujarat by Pravin et al. (1998) and of Andhra Pradesh by Ramarao et al. (2002). Various aspects of seer fish gillnets in other coasts of India were studied by Sreekrishna et al. (1972), Sulochanan et al. (1975), Rao et al. (1980) and Thomas & Hridayanathan (2002). However, the design and technical details of seer fish gillnets of Ratnagiri were not reported. The present study is the first attempt on the documentation of the design and technical specifications of seer fish gillnets operated from Ratnagiri.

Materials and Methods

The study was carried out during the period August 2009 to May 2010. The detailed information regarding the design and construction of seer fish gillnets operated off Ratnagiri was collected by physically sampling the units in operation. The data were recorded according to Sreekrishna & Shenoy (2001) and Thomas & Hridayanathan (2006) while the design of the gear was documented as per Nedelec (1975).

Results and Discussion

Technical specifications and design details of seer fish gillnets of different mesh sizes operated from Ratnagiri are given in Table 1. Design of a typical net is depicted in Fig. 1. The nets were with webbings of different mesh sizes used in combination to capture different size groups of fishes, which however is not a good practice. The nets were without foot ropes and were operated as surface drift net during September to December and column drift net from October to May. Similar observations were recorded by Pravin et al. (1998) in Gujarat where, seer fish gillnets were operated as surface

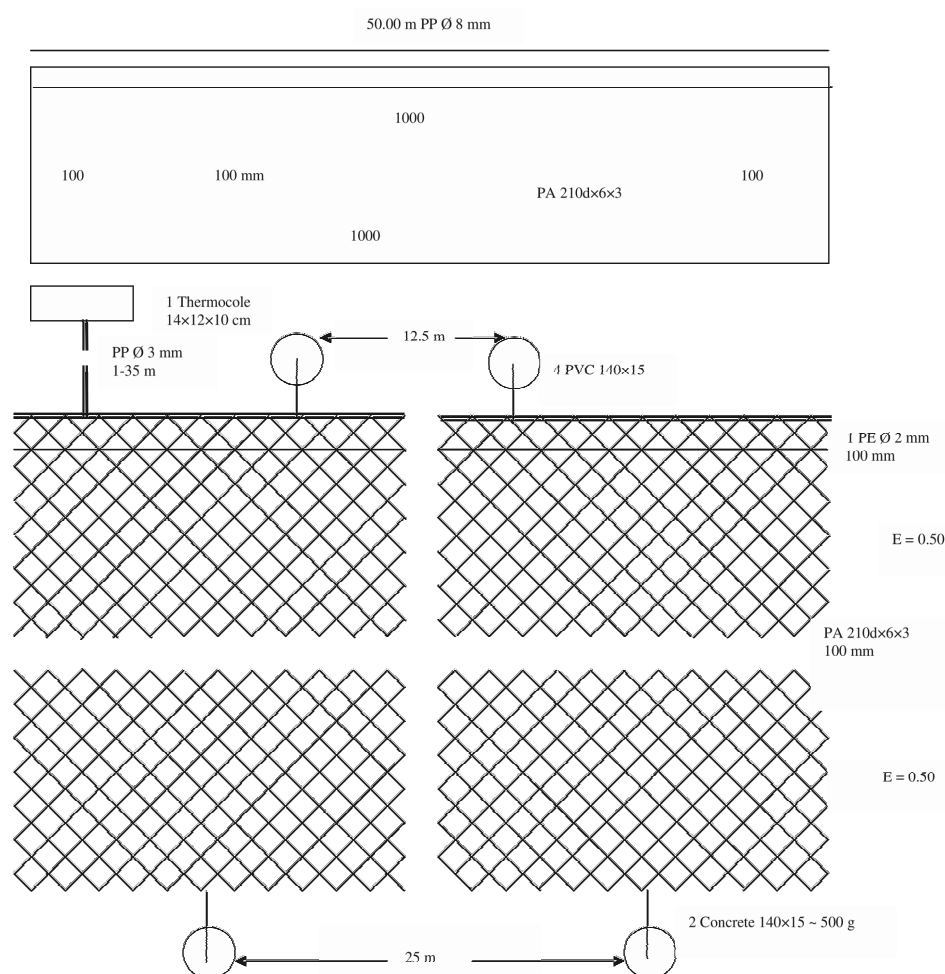


Fig. 1. Design of a typical seer fish gillnet unit operated from Ratnagiri

drift, column drift and bottom drift nets. Thomas & Hridayanathan (2006) observed that the seer fish gillnets of Kerala were operated in column or surface depending on the swimming layer of the fish during different seasons and were rigged without sinkers or even footrope. A comparison of the seer fish gillnets of Kerala between 1958 and 1991 showed that though the material and mesh sizes changed, the practice of operating the gear as drift net had not been changed (Vijayan et al., 1993).

The net was made of polyamide (PA) multifilament twine of varying specifications (210d×2×3 to 210d×12×3) according to the mesh size used *viz.*, bigger the mesh size, thicker the twine (Table 1). Sulochanan et al. (1975) suggested 210d×12×3 as the optimum twine size for gillnets targeting *Scomberomorus commersoni*. PA multifilament twine 210d×6×3 was the material commonly used for seer

fish gillnets along Kerala coast during the 1990s while hemp was in use in 1958 (Vijayan et al., 1993). Besides PA multifilament twine of 210d×3×3 to 210d×12×3, fishermen of Gujarat and Andhra Pradesh used PA monofilament yarn of 0.28 to 0.32 mm diameter and polyethylene (PE) twisted monofilament of 2 to 2.5 mm diameter for the fabrication of seer fish gillnets (Pravin et al., 1998; Ramarao et al., 2002; Thomas et al., 2005). Thomas & Hridayanathan (2002) compared seer fish gillnets of PE twisted monofilament of 1.25 mm diameter and PA 210d×6×3 and indicated that PE twine of 1.25 mm diameter could be considered for replacement of PA 210d×6×3 in gillnets for seer and tuna.

The mesh sizes of the seer gillnets ranged between 70 and 150 mm in Ratnagiri (Table 1). Fishing trials conducted by Banerjee & Chakrabarty (1972) in lower Sundarbans showed that *Scomberomorus*

Table 1. Technical specifications of seer fish gillnets operated from Ratnagiri

Local name (s)	Magar net, Ghagra and Towerchi rapan							
	70	75	90	100	115	120	130	150
Main webbing mesh size (mm)	70	75	90	100	115	120	130	150
Twine type	PA multi	PA multi	PA multi	PA multi	PA multi	PA multi	PA multi	PA multi
Twine specification/ diameter (mm)	210×2×3/ 210×4×3	210×3×3/ 210×4×3	210×4×3/ 210×6×3	210×6×3/ 210×8×3	210×8×3	210×8×3/ 210×10×3	210×10×3/ 210×12×3	210×12×3
No. of meshes in depth	120-200	150	120-150	90-120	90	90-100	75-90	75
Horizontal hanging coefficient	0.59-0.61	0.43-0.62	0.48-0.67	0.40-0.65	0.44-0.58	0.48-0.63	0.42-0.63	0.41-0.54
No. of meshes per unit	1080-1288	615-1040	600-1290	533-1190	600-1036	600-1126	600-1290	492-1086
Hung length (m)	44.16-55.00	21.21-43.92	34.02-68.04	22.91-70.20	30.36-66.71	44.64-81.64	32.76-82.83	30.25-78.04
Hung depth (m)	6.63-11.20	8.88-10.12	7.45-11.74	7.5-10.80	8.38-9.21	8.1-10.44	7.8-11.41	9.56-10.23
Colour of webbing	Green	Green	Green/Brown	Green	Green	Green	Green	Green
Selvedge twine type	PE	PE	PE	PE	PE	PE	PE	PE
Selvedge specification/diameter (mm)	1	1-1.5	1-1.5	1-1.5	1-1.5	1-1.5	1-1.5	1.5-2
Selvedge mesh size (mm)	70	75	90	100	115	120	130	150
No. of selvedge meshes in depth	1	1	1	1	1	1	1	1
Total hung depth (m)	6.68-11.25	8.94-10.18	7.51-11.81	7.58-10.88	8.47-9.31	8.20-10.54	7.90-11.42	9.69-10.36
Head rope material	PP							
Head rope diameter (mm)	8							
Float material	PVC							
Float dimensions (mm)	130×15/125×20/140×15							
No. of floats per unit	4-10							
Foot rope material	No foot rope							
Sinker material	Concrete							
Sinker dimension	60×20/80×33/100×20/140×15							
Sinker weight (g)	400-500							
No. of sinkers per unit	2-6							
Total fleet length (m)	1098-2560							
Depth of operation (m)	28-73							

PA : Polyamide; PE : Polyethylene; PVC : Polyvinyl chloride; PP : Polypropylene

S. guttatus was mainly gilled by 88 mm meshes. Sreekrishna et al. (1972) suggested 104 mm as the optimum mesh size for *S. guttatus*, while Sulochanan et al. (1975) suggested 152 mm mesh size for *S. commerson* of 850 to 950 mm size group, which was quite similar to the mesh size observed during the present study. Mesh sizes ranging from 40 to 140, 60 to 150 and 70 to 140 mm were common in seer fish gillnets in Gujarat, Andhra Pradesh and Kerala respectively (Thomas et al., 2005). The hanging coefficient of the seer fish gillnets varied between 0.40 and 0.67 (Table 1). The nets of Andhra Pradesh had hanging coefficient ranging from 0.50 to 0.65 while nets of Kerala had 0.44 to 0.71 (Thomas & Hridayanathan, 2006). The nets in Ratnagiri were dyed with dark green and brown colour. Rao et al. (1980) studied the effect of white, green, blue and yellow coloured drift gillnets on the catch along the Andhra coast. White nets were more effective for

S. guttatus, while the coloured ones caught more of *Parastromateus niger*. In the case of *Scomberomorus lineolatus* and *S. commerson*, no preference to colour was noted. Though dark green or brown colour was preferred by Ratnagiri fishermen for seer fish gillnets, similar colour preference was not reported elsewhere along the Indian coast.

The hung length of each unit of seer fish gillnet varied from 21.21 to 82.83 m and the hung depth from 6.63 to 11.74 m (Table 1). Nets of Kerala had a depth ranging between 5 and 5.8 m in 1958 and it increased upto 15.1 m during 1991 (Vijayan et al., 1993) while nets of Andhra Pradesh had 5 to 12 m depth (Ramarao et al., 2002).

The total fleet length of the nets ranged between 1098 and 2560 m (Table 1) and hence as per Northridge (1991), this sector can be classified under 'small scale drift net fisheries'. Each fleet of net had

20 to 45 units having webbings of different mesh sizes in combination to capture different size groups of fishes. Motorized and mechanized gillnetters operated at depths ranging between 28 and 73 m (Table 1). The depth of operation of seer fish gillnetters ranged from 19 to 300 m in Kerala and 35 to 80 m in Karnataka (Thomas et al., 2005). Each unit of net was rigged with head rope of polypropylene (PP) 8 mm diameter and with 4 to 10 floats of expanded polyvinyl chloride (PVC). The nets were devoid of foot rope. Two to six circular concrete sinkers (*Patri*) per unit of net were attached directly to the main webbing as foot rope was absent.

The nets were operated as surface drift during September to December and column drift during October to May. During column drift netting, the float line was rigged in such a way that it remained below the surface. After shooting, one end of the net was tied to the vessel and was allowed to drift along with the net. Both day and night operations were carried out from Ratnagiri. During night fishing, the indicator flag poles attached with solar energy operated flash lamps were tied to either ends of the net for locating the nets. More than two flag poles were used when longer nets were in operation.

The seer fish gillnets operated in Ratnagiri, comprised of webbings of different mesh sizes in combination to capture different size groups of fishes, which is not a good practice. The seer fish gillnet fishing sector of Ratnagiri comes under the category of 'small scale drift net fisheries' as fleet length of majority of the units was below 2500 m. The documented information on the design, technical characteristics and operation of seer fish gillnets of Ratnagiri, would serve as base line data which would help in the process of technological innovations the net may undergo in the coming years.

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