International Research Journal of Natural and Applied Sciences
Vol. 3, Issue 6, June 2016 IF- 3.827 ISSN: (2349-4077)
© Associated Asia Research Foundation (AARF)
Website: www.aarf.asia Email : editor@aarf.asia , editoraarf@gmail.com

TECHNICAL SPECIFICATIONS AND DESIGN ASPECTS OF SPOTTED CROAKER (*GHOL* FISH*)* GILL NETS OPERATED OFF SATPATI, MAHARASHTRA

Shri. Shreyas S. Khatavkar,
Department of Fisheries Engineering,
College of Fisheries, Shirgaon,
Ratnagiri–415 629, India.

Dr. Ashish S. Mohite,
Professor & Head,
Department of Fisheries Engineering,
College of Fisheries, Shirgaon,
Ratnagiri–415 629, India.

Shri. Ajay S. Desai,
Assistant Professor,
Department of Fisheries Engineering,
College of Fisheries, Shirgaon,
Ratnagiri–415 629, India.

ABSTRACT

Gill net is one of the popular fishing methods along the west coast of India. However, there are regional variation in the design, construction and operation. The present study deals with design, technical specification and operation of Ghol fish gill nets (Protonibea dicanthus) operated off Satpati, Maharashtra. Spotted croaker (Ghol fish) set gill nets were made up of Polyamide (PA) multifilament of diameter 210x12x3 to 210x15x3 mm. White colour was commonly used. The mesh size used for Ghol fish gill net was 215 to 225 mm with the mean of 220 ±0.52mm for the main webbing and the selvedge were absent. The hanging coefficient ranged between 0.33 to 0.40 with mean of 0.37±0.002. The hung length varied

from 33 to 35 m, the total hung depth varied from 4 to 5 m while the fleet length of Spotted croaker (Ghol fish) gill net ranged from 1650 to 2805 m. The depth of the operation for Ghol fish gill nets ranged from 60-90 m off Maharashtra and Gujarat coast. The nets were operated as bottom set gill net.

KEY WORDS Gill net, Design, Spotted craoker, *Ghol* fish, *Protonibea dicanthus*

Gillnets are of special interest to small-scale fishermen, due to the simple design, low investment, high energy efficiency and the requirement of only simple non-specialised small craft for their operation. Being a low energy fishing method, gillnet fishing is favoured in recent years in the context of escalating fuel costs. It is a highly selective gear, as the fish of a particular size in relation to the selected mesh size only is caught while the smaller fishes are able to escape. It is a low energy fishing method using relatively low powered vessels expending fuel only for propulsion and not for actual fishing operation (Thomas, 2010). Maharashtra is one of the major maritime states of India having 720 km of coast line spread over six districts *viz.* Thane, Palghar, Mumbai, Raigad, Ratnagiri and Sindhudurg. In Palghar, a total of 350 gillnetters were in operation (Anon, 2014).

Design and general characteristics of marine gill nets of Kerala have been discussed by Vijayan et al., (1993) and Thomas & Hridaynathan (2006). Gill nets are used extensively by the small-scale artisanal fishermen in the fresh, brackish and coastal water (Solarin & Kusemiju, 2003; Emmanuel *et al.*, 2008; Emmanuel, 2009). In gill net, the mesh should be shaped in such away, adjusting to the hanging coefficient that, a fish is caught being gilled. The capture of fish is achieved by one mesh in a gill net, whereas by more than one mesh by entangling type, where it is caught by fouling of meshes in the fish body (Badapanda, 2012). However, the design and technical details of *Ghol* fish gill nets of Satpati, Thane district of Maharashtra state were not reported. The present study is the first attempt on the documentation of the design and technical specification of *Ghol* fish gillnets operated from Satpati.

METHODOLOGY

The study was carried out during the fishing season from December 2014 to May 2015. The detail information regarding design and construction of gill nets was undertaken by physical sampling of the units and by collecting information from gill net owners in the study

area. 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 different types of marine gill nets used by the fisherman of Satpati. 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). The net design of the gill net was presented according to Nedelec (1975).

RESULTS AND DISCUSSION

The specification and design of the Spotted croaker (*Ghol* fish) gill net is shown in Table 1 and Fig 1, respectively. The *Ghol* fish gill net was locally known as "*Waghara*".

In the present study, it was observed that the main webbing of *Ghol* fish gill nets were made up of Polyamide multifilament of diameter 210x12x3 and 210x15x3. Ramarao et al. (2002) recorded that the Spotted croaker gill net with material specification of Polyamide monofilament with 0.16 mm diameter was used in Andhra Pradesh. Manoj Kumar (2007) reported, Polyamide monofilament material of 140 to 160 mm diameter in Veraval for construction of main webbing.

In Satpati, the mesh size of main webbing for *Ghol* fish gill net varied from 215 to 225 mm with mean of 220 ±0.52 mm. Ramarao et al. (2002) reported that gill net for Spotted croaker fishing with mesh size of 60 mm as used in Andhra Pradesh, while 120 mm mesh size has been reported by Dutta et al. (2014) in West Bengal. During present study, it was recorded that, the horizontal hanging coefficient of the *Ghol* fish gill net ranged from 0.33 to 0.40 with mean of 0.37 ± 0.002. Slightly higher hanging coefficient of 0.50 for Spotted croaker gill net was recorded by Ramarao et al. (2002) in Andhra Pradesh.

Table 1 SPECIFICATION OF SPOTTED CROAKER (*GHOL* FISH) SET GILL NET (*WAGHARA*) OPERATED FROM SATPATI, MAHARASHTRA

Station	**Satpati**	
Local name	Waghara	
Main webbing mesh size (mm)	215	225
Mean main webbing mesh size (mm)	220 ±0.52	
Twine type	Polyamide multifilament	Polyamide multifilament
Twine specification / diameter (mm)	210x12x3, 210x15x3	210x12x3, 210x15x3
No. of meshes in depth	22	
Horizontal hanging coefficient (E)	0.33 - 0.40	0.33 - 0.38
Mean horizontal hanging coefficient (E)	0.37 ±0.002	
Vertical hanging coefficient (1-E2)	0.84 - 0.89	0.86 - 0.89
Mean vertical hanging coefficient (1-E2)	0.86 ±0.002	
No. of meshes per unit	400 – 500	
Mean no. of meshes per unit	452.22 ±5.29	
Hung length (m)	30 – 35	
Mean Hung length (m)	32.61 ±0.26	
Color webbing	White	
Selvedge twine type	Absent	
Selvedge specification / diameter (mm)	Absent	
Selvedge mesh size (mm)	Absent	
No. of selvedge meshes in depth	Absent	
Selvedge hung depth (m)	Absent	
Total hung depth (m)	4 – 5	
Head rope material	Polypropylene	
Head rope diameter (mm)	6-8	
Float material	Polyvinyl Chloride	
Float dimension (mm)	120x90	
No.of floats per unit	10-12	
Mean no.of floats per unit	10.98 ±0.09	
Foot rope material	Polypropylene	
Foot rope diameter (mm)	6-8	
Sinker material	Cemented	
Sinker dimension (mm)	120x30	
Sinker weight (g)	250-300	
No. of sinkers per unit	10-12	
Mean No. of sinkers per unit	10.98 ±0.09	
Total fleet length (m)	1650 – 2805	
Mean total fleet length (m)	2235 ±41.26	
Depth of operation (m)	60-90	
Fishing craft	Wooden and FRP mechanized	
Horse power of the engine (HP)	12-16	

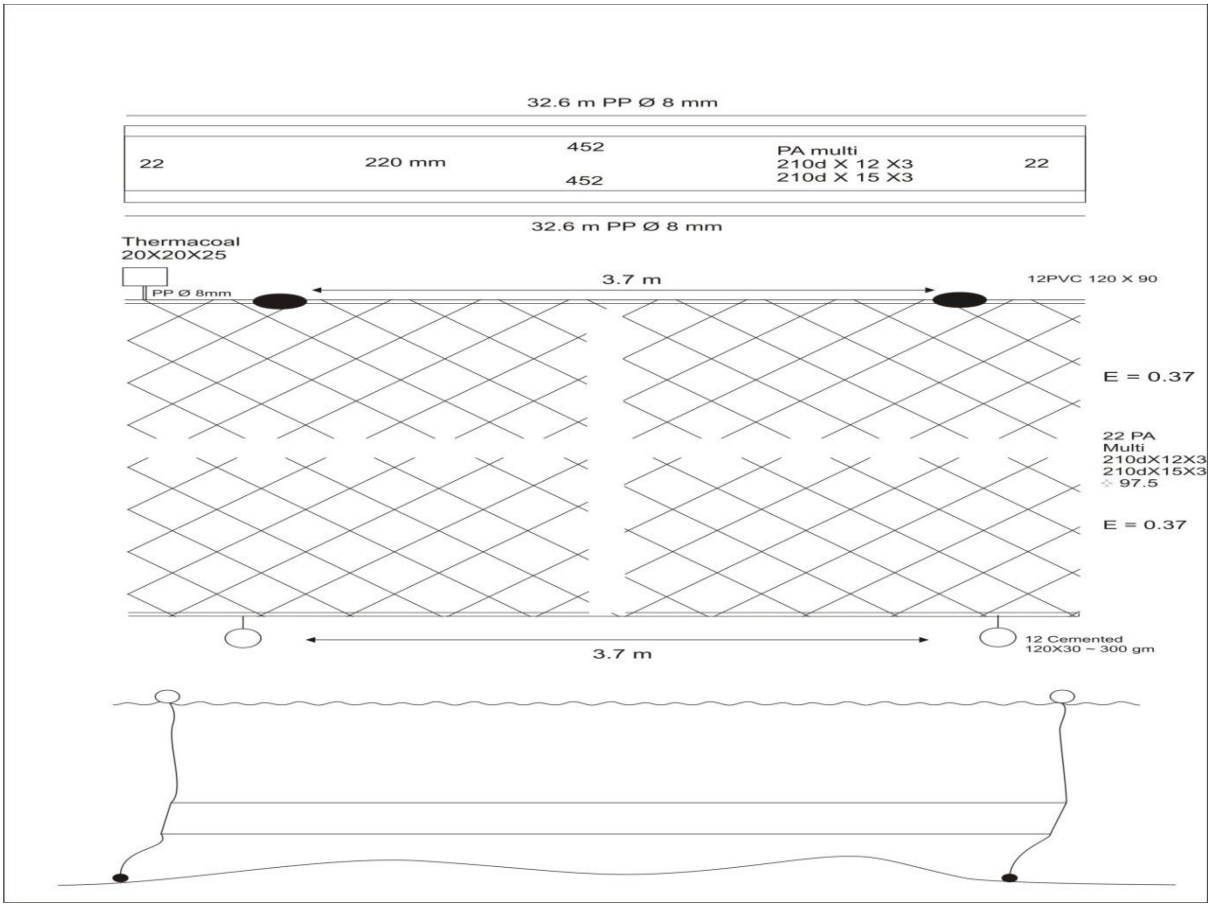

Fig 1 DESIGN OF SPOTTED CRAOKER (*GHOL* FISH) SET GILL NET OPERATED FROM SATPATI, MAHARASHTRA

In Satpati, white coloured twines were most commonly used for construction of *Ghol* fish gill nets, while the hung length for each fishing unit varied from 30 to 35 m with mean of 32.61 ±0.26 m. Ramarao et al. (2002) observed the gill net in Andhra Pradesh with average hung length of 800 m. In Satpati gill nets were fabricated with the hung depth varying from 4 to 5 m with mean of 4.5 m. Ramarao *et al.* (2002) reported that the hung depth of 9.6 m for Spotted croaker gill net in Andhra Pradesh. In the present study, the *Ghol* fish gill net with total fleet length varied from 1650 to 2805 m with mean of 2235 ±41.26 m and the depth of the operation ranged from 60 to 90 m. Manoj Kumar (2007) reported that fleet length of 22 to 28 m with depth of operation of 120 m for Spotted craoker gill net in Veraval, Gujarat.

Head rope and foot rope 6 to 8 mm of diameter was most commonly used as for this type of net. During the present study it was observed that, mounting rope and selvedge were absent in the *Ghol* fish gill net. It was estimated that 10 to 12 numbers per unit with mean of 10.98 ± 0.09 of oval shaped Polyvinylchloride (PVC) floats (*Budhi*) were also attached to the head rope and circular shaped cemented sinkers (*Ghata*) attached to the foot rope. The Fibre reinforced plastic (FRP) made master floats were attached to the head rope after eight units

with flags (*Shinda*) act as indicator float. Also one cemented circular stone was used as master sinker attached to the foot rope of weight 10 to 12 kg. Similarly the marker floats of thermocole made (*Bhusa*) were also attached to the head rope per unit. The dimension of the marker floats was 20x20x25 cm. The dimension of the master floats and flag was 75x45 cm and 60x45 cm, respectively.

In Satpati, 100 numbers of units were joined 'end to end' by making knots at head rope and foot rope as well as sieving at alternate meshes throughout the depth of the net to form a netting fleet. During the study it was observed that *Ghol* fish gill net were operated as bottom set gill net. Ramarao et al. (2002) reported that Spotted croaker gill net of Andhra Pradesh were used as a bottom set gill net as well as mid water gill net and surface drift nets. Manoj Kumar (2007) reported that Spotted croaker gill net were operated as surface drift net, surface or bottom gill nets for fishing in Veraval, Gujarat.

CONCLUSIONS

The documented information on the design and technical specifications of Spotted craoker (*Ghol* fish) set gill nets of village Satpati in the Palghar district of Maharashtra would serve as a base line information for the technological modifications the said gill net may undergo to increase its efficiency in the coming years.

ACKNOWLEDGEMENT

Authors wish to thank the authorities of College of Fisheries, Shirgaon, Ratnagiri (Dr. Balasaheb Sawant Kokan Krishi Vidyapeeth, Dapoli) for providing the necessary facilities, and their kind encouragement and guidance during the course of the investigation.

REFERENCES

Anon (2014). Fish Production Report 2013-2014. Department of Fisheries, Government of Maharashtra.

Badapanda, K. C. (2012). *Fishing Craft and Gear Technology*, Narendra Publishing House, Delhi, (3): 335-348.

Dutta, S., Giri, S., Dutta, J. and Hazra, S. (2014). Blackspotted crocker, *Prtonibea diacanthus* (Lacepede, 1802) A new dimension to the fishing pattern in West Bengal, India. *Croatian Journal of Fisheries*, 72, 41-44.

Emmanuel, B. E., Chukwu, L.O. and Azeez, L.O. (2008). Gill net selectivity and catch rates of pelagic fish in tropical coastal lagoonal ecosystem. *African Journal of Biotechnology* 7(21): 3962-3971

Emmanuel, B.E. (2009). The artisanal fishing gears, crafts technology and their efficiency in the Lekki lagoon, Nigeria. Ph. D. Thesis, University of Lagos, 268.

Kazi, T.G., Mohite, A.S. and Jadhav, R.R. (2010). Design and technical specification of Pomfret gill nets of Ratnagiri, Maharashtra. *Fisheries Engineering and Technology in India*, 1, 91-96.

Manoj Kumar, P.P. (2007). Fishery of Sciaenids off Veraval with special reference to growth, mortality and stock assessment of *Otolithes cuvieri*. *Indian Journal of Fisheries.* 54(1), 21-26.

Nedelec, C. (1975). FAO Catalogue of Small Scale Fishing Gear, *Fishing News Books (Ltd.),* Farnham, Surrey, England: 191.

Pravin, P., Thomas, S. N., Meenakumari, B., Baiju, M., Baruah, D., Barman, J., Kakti, B., Daimari P. and Mumtaz, V. R. (2009). Design and General characteristics of Gill nets of Assam. *Fishery Technology*, 46 (2), 107-122.

Ramarao, S.V.S., Rajeshwari, G. and Raghu Prakash, R.M. (2002). Studies on the gill nets of Andhra Pradesh. *Fishery Technology*, 39 (1), 15-19.

Solarin, B.B. and Kusemiju, K. (2003). The fishery and aspect of gillnets designs and operation in the Lagos lagoon, Nigeria. *Nigerian Journal of Fisheries.* (1) 62-69.

Thomas, S. N. and Hridayanathan, C. (2006). Design and general characteristics of marine gill nets of Kerala. *Fishery Technology*, 43 (1): 17-36.

Thomas, S. N. (2010). Coastal fisheries resources of India. Central Institute of Fisheries Technology, Cochin. *Society of Fisheries Technologists,* 314 – 326.

Vijayan V, Varghese, M. D., Leela Edwin, Thomas S. N. and George, V. C. (1993). Coastal gill nets of Kerala – changes in three decades, In: Low Energy Fishing, *Fishery Technology.* (Special Issue) Society of *Fisheries Technologists*, India: 172-176.