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DESIGN AND GENERAL CHARACTERISTICS OF TRAMMEL NET FOR CUTTLE FISH AND SQUID OPERATED ALONG THE SOUTHEAST COAST OF THOOTHUKUDI, TAMIL NADU, INDIA

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ABSTRACT

Trammel net is one of the important fishing gears operated along Thoothukudi coast of Tamil Nadu. This paper documents the design and general features of Cuttle Fish Trammel Net (CFTN) being operated by the fishermen of Therespuram fishing village to capture Cuttle fishes and Squids. It was observed that both the inner and outer panels of CFTN were made of Nylon mono filament webbing. The mesh size of the inner panel ranged from 52 mm to 60 mm, whereas the mesh sizes of outer panels ranged from 265 to 290 mm. The number of meshes in the inner and outer panels of CFTN along length was 1,500 and 350 respectively whereas along the depth the number of meshes was 50 and 7-8 respectively. The hanging coefficient of inner and outer panel was estimated to be 0.4 and 0.7, respectively. A pair of polypropylene ropes (PP) with thickness of 3-5 and 3 mm were tied together and used as head rope and foot rope in CFTN. A total 6 to 10 units of trammel nets were found to be used per fishing trip. The trammel nets were set before sunrise and hauled after the soaking duration of 3 hrs. Indiscriminate fishing with respect to different sizes of both cuttle fishes and squids was the major problem encountered in this net due to its entangling nature. Among the various species captured by the trammel net finfishes are found to be the dominant species (70.9 Kg/soaking day) followed by cuttle fishes (8.1 Kg/ soaking day). Crabs were the least dominant species with catch rate of 1.4 Kg/soaking day.

Keywords: Cuttle fish, Mesh size, Squid, Trammel net

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INTRODUCTION

The coastal state, Tamil Nadu is blessed with 1,076 km of coastal length, 1.90 lakh sq.km of Exclusive Economic Zone

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(EEZ) and 41,412 sq. km of continental shelf area. A total of 7,87,474 fisher folks depend on fisheries for their livelihood income. The artisanal fisheries play an important role in both harvesting marine fishery resources and livelihood to millions of the fishermen. Out of 41,089 registered fishing craft in Tamil Nadu, 5,263 are non-motorized, 29,774 are motorized and 5,952 are mechanized.

About 85% of Tamil Nadu fishing vessels belongs to artisanal fishery (motorized and non-motorized) (Anon, 2017). Among various fishing net operated by these fishermen, Trammel net is a type of entangle net popularly called as *Kitchamucha valai* operated by the artisanal fishermen of Thoothukudi. It is designed by joining an inner panel called as *Lint* with two outer panels outer panel called as *Armour*. The trammel nets are mostly used for catching of bottom living marine organism such as fishes, crabs, shrimps, cuttle fishes and squids. Nylon monofilament or multifilament or combinations of these are being used for making the trammel net. This net is operated both in inland waters (Dutta, 1973; Banerjee and Chakravarthy, 1972; Ramesan and Ramachandran, 2005; Pravin *et al.,* 2009) and marine (Vijayan *et al*., 1993; Ramarao *et al*., 2002; Thomas and Hridayanathan, 2006; Kazi *et al*., 2011) waters. Generally the design and general characteristics of net varies with targeted species. Many studies revealed that trammel nets lands fishes, shrimp and crab but very few studies reported squid. With this purview, the present study was carried out to document the design and general characteristics of the trammel net being operated for cuttle fish and squid along Thoothukudi, Tamil Nadu.

MATERIAL AND METHODS

The present study was carried out from September 2020 to February 2021 at Therespuram (Lat 8^{o} 48'48'' N; Long 78^{o} 09'54'' E) fishing village of Thoothukudi district of Tamil Nadu (Fig.1). There are about 1007 numbers of fishing boats operated from Therespuram of which 50 numbers of fishing boats were exclusively operated for cuttle fish and squid trammel net. The technical specifications and operational details of trammel nets were collected using a pretested detailed questionnaire. The technical specifications such as twine size, mesh size, hanging coefficient, etc. were recorded. The mesh size of the nets used by the fishermen was measured between two opposite knots of the stretched mesh using a divider. These nets were operated from the traditional plank built boats of Thoothukudi origin, popularly called "Vallams" with 12-15 m length overall. The operational details such as depth of operation, shooting and hauling time and soaking duration were collected. The fishermen start their trip by 10 PM; reaches fishing ground around 1AM and return to shore by 10 AM. The nets are operated at 30-50 m depth with distance of 20-30 nautical mile from the shore.

RESULTS

The trammel net is locally called as *Kanavavalai* used to capture cuttle fishes and squids along coast of Thoothukudi. The technical specifications of the typical trammel net operated along Thoothukudi are given in Table 1. The inner and outer panels of trammel net were made of nylon mono filament webbing with a diameter of 0.2 and 0.4 mm respectively. The mesh size of the

Fig. 1. Description of the study area

inner panel ranged from 52 to 60 mm whereas the mesh sizes of outer panels varied from 265 to 290 mm. The number of meshes in the inner and outer panels of CFTN along length was 1500 and 350 respectively whereas along the depth the numbers of meshes were 50 and 7-8 respectively. The hanging coefficient of inner and outer panel of CFTN was estimated to be 0.4 and 0.7, respectively. A pair of 3-5 mm and 3 mm thickness polypropylene ropes tied together was found used as head rope and foot rope in CFTN. Disc shaped corks were commonly used as floats in the head rope. The floats were attached at the interval of every 60 to 75 meshes in head rope. The spindle shaped leads weighed about 20 g were used as sinkers. The sinkers were attached at the interval of every 15 to 20 meshes in foot rope. The general characteristics of trammel net operated at Thoothukudi coast are given in Fig. 2. The fisherman carries 6 to 10 units of trammel nets/boat. Each unit of trammel net was made by joining of 7 to 8 trammel nets. Blue, green and white were the three different colours of trammel net commonly found operated. Among these, white coloured trammel was found be highest catch rate than that of blue and green coloured trammel nets. The peak fishing season for cuttle fish and squid was December to February.

Vallam with a 20 HP inboard Kirloskar engine or outboard Lambadi engine was used for operating the trammel net. As per the crew share is concerned, the amount spent towards purchase of fuel was deducted from the gross income and the remaining amount was divided into two equal portions, one portion for the boat owner and another portion for crew members, which was shared equally among themselves. The trammel nets mostly caught cuttle fishes, squids, crabs, sea weeds, and fin fishes like carangids, lethrinids, lutjanids, goat fishes, rays etc. It was observed that cuttle fishes weighing 100g to 3.0 kg size and squids weighing 50 g to 2.0 kg formed the fishery. The catch details for a soaking day are given in the Table 2.

DISCUSSION

Joel and Ebenezer (1985) reported that the trammel nets known as *disco valai* introduced into the state during mid-eighties are popular only in Thiruvananthapuram and

Table 1. Design and general characteristics of the typical trammel net operated along Thoothukudi coast

Inner Panel (Lint)	Mesh size (mm)	52-60
	Material	PA monofilament
	Twine size (mm)	0.2
	No. of meshes in length	1500
	No. of meshes in depth	50
	Hanging ratio	0.41
	Colour	Blue, Green, White
Outer Panel (Armour)	Mesh size	265-290
	Material	PA monofilament
	Twine size (mm)	0.4
	No.of meshes in length	350
	No.of meshes in depth	7-8
	Hanging ratio	0.72
	Colour	Green
Rope	Material	Poly propylene
	Head rope Diameter (mm)	3-5
	Foot rope Diameter (mm)	3
Float	Material	Cork
	Shape	Round
	Dimension (mm)	50x20 and 60x20
	No.of floats per unit	20-25
Sinker	Material	Lead
	Shape	Spindle
	Weight (gm)	20
	No.of sinker per unit	70-100
No. of units/boat		6-10
Depth of operation		10-50 m
Fishing ground		Rocky
Cost of net/unit		Rs.2,500

Table 2. Catch details of trammel net operated at Thoothukudi

Species	Quantity (Kg)	Percentage (%)
Cuttle fish	8.1	9
Squid	4.7	5
Octopus	1.8	2
Crabs	1.4	1
Fin fishes	70.9	76
Others	6.8	7
Total	93.7	100

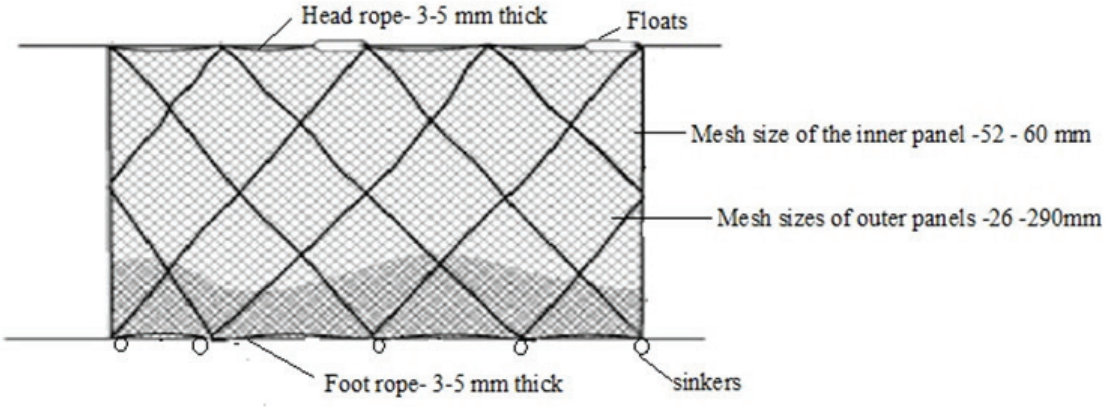

Fig. 2. General characteristics of trammel net operated at Thoothukudi

Kollam. Mariappan *et al.* (2019) reported that trammel is locally called as *Eppovalai* made by nylon multifilament mostly used to catch shrimps at Pulicat. In this present study it was found that trammel is locally called as *Disco Valai or Kanavavalai* made by nylon monofilament used to catch cuttle fishes and squids. Waghmare *et al.* (2018) reported that trammel net with the mesh size ranged between 46 to 48 mm for inner small mesh panel and mesh size of 240 to 250 mm was used for the two outer large identical panels operated for shrimps in Sindhudurg, Maharashtra. In this study it was revealed that the mesh size of the inner panel ranged from 52 to 60 mm whereas the mesh sizes of outer panels varied from 265to 290 mm.

Fiscus and Mercer (1982) reported that gillnets operated at North Pacific Ocean landed six species of squids and one species of octopus. Whereas the trammel net operated at Thoothukudi coast landed cuttle fish (9%), squid (5%) and octopus (2%), crab (1%) and

fin fish (76%) and others (7%) in a soaking day. The trammel net used along Thoothukudi coast captured various species mainly fishes but it was called as cuttle fish trammel net due to the premium price of cuttle fish. It was also observed that these trammel nets were capturing cuttle fish and squid indiscriminately due to its entangling nature.

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