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Design and General Characteristics of '*Disco Dol*' (Two Seam Trawl) Operated along Ratnagiri, Maharashtra

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present investigation was taken to know the variations with respect to design, net specification, mesh size of *Disco dol* trawl net operated along the Ratnagiri coast. A total of 42 trawl net was sampled physically by using measurement tape and scale. The data were collected by structured schedule consisting of two major sections. The first section was for vessel details and second for the specifications of trawl nets. The study revealed that, two seam locally known '*Disco dol*', operated from Ratnagiri was observed with eight belly sections of overall length ranges from 41 to 52m. Wings of the net were triangular in shape with a mesh size variation between 120-440 mm. The dimensions such as breadth, number of meshes along breadth and mesh size were decreasing from first to last belly section, but average number of meshes per metre were increasing from first to last belly. Wide reduction of 400-40 mm was observed in mesh sizes of belly section for *Disco dol* from first to last belly. Cod end mesh size of trawl operated from Jaigad, Kasarveli, Mirkarwada and Purnagad landing centres was recorded as 20 mm. In Ratnagiri, two seam trawl net was used mainly to catch fishes.

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1. INTRODUCTION

Trawling, though an efficient method of fishing is known to be one of the most non-selective methods of fish capture. Trawl is an important marine fishing gear, nearly 20 per cent of the marine fish landed in the world is caught by this gear [1]. (In a known fishing ground, the quantity of fish caught by trawl gear has direct bearing on the volume of water filtered during a certain period of operation and depends on both the horizontal and vertical opening of the net while in operation [2]. Trawl is an important fishing gear operated from mechanized vessels along the Maharashtra coast. Along Ratnagiri coast various kinds of trawls are being used along the coast of Ratnagiri, in which *Disco dol* is been used for capturing fishes. These nets are fabricated locally.

Variations in trawler and trawl net are observed due to geographical variation, species caught and technical know-how. The trawl nets used along the Ratnagiri coast are fabricated by local net maker [3] and the trawl is designed as per the individual fabrication of the net is as per the individual requirement of fisherman and prevailing local practices without following any standard design or specifications but are largely based on the individual fishing experience [4]. Thus, variation in designs pattern and rigging practices are observed. Hence, present investigation was taken to know the variations with respect to design, net specification, mesh size of *Disco dol* trawl net operated along the Ratnagiri coast.

2. MATERIALS AND METHODS

2.1 Study Area

The four main marine fish landing centres namely Jaigad and Kasarveli at north of Ratnagiri, Mirkarwada at Ratnagiri town and Purnagad at south of Ratnagiri were selected for the present study.

2.2 Sampling Procedure

The data were collected by structured schedule consisting of two major sections. The first section was for vessel details and second for the specifications of trawl nets. The information about the particular of the trawl operators was recorded according to Sreekrishna Y, Shenoy L. [1], whereas the information regarding detail specifications of trawl net was collected according to Neethiselvan N, Brucelee G [5]. A total of 42 trawl net was sampled physically by using measurement tape and scale.

2.3 Statistical Analysis

The collected data was analysed with suitable multivariate data analysis techniques [6] and statistical methods [7]

3. RESULTS AND DISCUSSIONS

Disco dol was a two seam fish trawl net without side panel which is mainly to catch fishes. Majority of this type of trawl nets were with seven belly sections (85.71%) whereas only 14.29% were with eight belly sections. Number of belly sections for fish trawl net were two along the Thoothukkudi coast [5], and four along the Tamil Nadu coast [8]. Number of belly sections recorded during the present study were more in number as compared to other nets operated along the Indian coast as well as other parts of the world except the net reported by FAO [9] with six belly sections. The reason for variation in the number of belly sections may be to achieve the higher mouth opening, which was possible only by increasing the number of belly sections to maintain the creasing or baiting ratio from wing section to cod end. The increased mesh number will also improve water resistance. The filtration rate will decrease, and the speed will be slower, which will help to reduce diesel consumption indirectly.

The length of the head and foot rope for the *Disco dol* trawl net operated along the Ratnagiri has ranged between 28-42 m and 32-46 m respectively. Minimum head rope length recorded during the present study was more as recorded by other workers [10],[11],[3]. The Head rope length recorded by but was nearer to the lengths reported by [11] as well as [12]. Length of the foot rope observed during the present study was higher than the lengths observed in other studies along the Indian coast [5],[13]. The schematic diagram of *Disco dol* is shown in Fig.1.

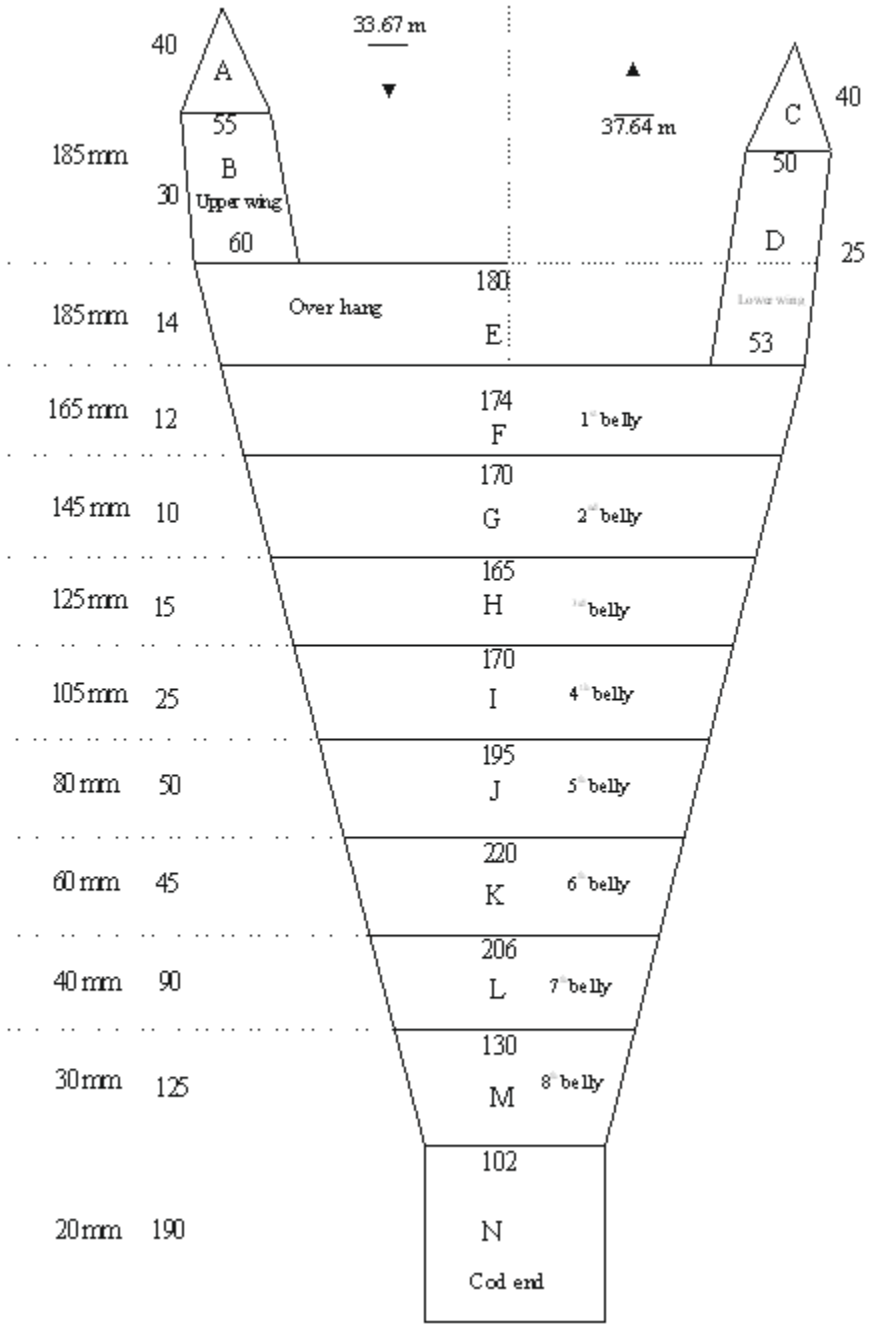

Fig.1. Schematic diagramme of designed *Disco dol* with eight belly sections

The highest average overall length of eight belly sections trawl net recorded was 52.1400 ± 0.8295 m whereas, the lowest values recorded was 41.6467 ± 1.1205 m. Overall length of 11.4 m was reported by Deshpande and Kartha [19] for two seam trawl nets operated along the Veraval coast, which seems to be too less than overall length of trawl nets operated along the Ratnagiri coast. On the contrary, overall lengths reported by FAO [9] and FAO [14] were too high than the overall length recorded during the present study.

Floats and sinkers used for rigging the *Disco dol* net were high of density polyethylene (HDPE) which were spherical in shape which is same as that reported along Ratnagiri [15] but the floats used along the Indian coast in other part of

country were of aluminium alloy spherical floats [12], [16], [17]. The number of floats were rigged either three of 254 mm or five of 304 mm. Float weight has ranged between 2.1-4.2 kg. The number of rings present in case of *Disco dol* were 10-12 in numbers. The dimension of the ring was 6-10 mm and weight in air was 20-40 kg. The number of floats and size of floats reported by Perumal [10] was less than the number of floats and size recorded in the present study and sinkers used by them was of lead.

Average values of all measurements recorded on wing section were not significantly different between the stations. Maximum mesh size of 440 mm was recorded at Mirkarwada and Jaigad while the minimum of 120 mm at Mirkarwada. Maximum mesh size of 440 mm recorded during the present study was too high as compared to recorded mesh sizes of 60 mm [18], 80 mm [10], [13], 200 mm [8] but the minimum mesh size recorded of 120 mm was in accordance with [5]. *Disco dol* is a fish trawl thus the larger mesh sizes recorded were appropriate which helped in reduction of water resistance intern reduction in diesel consumption.

Mesh size recorded for the wing section of seven belly sections trawl net had ranged between 120-140 mm, which was of lower magnitude as compared to the eight belly sections trawl net. The number of meshes per metre for all measurements recorded on wing section were minimum in case of seven belly sections trawl net than the eight belly sections trawl net.

Average values of all the measurements recorded for overhang section at different landing centres were not significantly different from each other. Mesh size of overhang section of *Disco dol* was same as that of wing section. Maximum number of meshes along breadth and length for the overhang section were recorded at Mirkarwada. The number of meshes along breadth and length of overhang reported for trawl net operated along the Indian coast by various workers were with higher magnitude than the present work [18], [10], [8], [13], [5] as well as in the other countries FAO [9] and FAO [14].

The maximum and minimum values of number of meshes along breadth and length of fore as well as aft section of both panels were recorded at Mirkarwada except the maximum values of number of meshes along length of fore section of both panels were recorded at Jaigad. The number of meshes reported along breadth of fore section for upper and lower wing sections were of lower magnitude [13], [8]. than recorded in the present study and of higher magnitude than reported by [5], but number of meshes along length reported by them was with higher value as compared to the present study. The number of meshes along fore breadth of upper wing as well as fore breadth, number of meshes along fore breadth, number of meshes along aft breadth and number of meshes along aft length of lower wing were significantly different from standard net of CIFT (1998) [19].

Average values of all the measurements for the belly sections recorded at different stations were not significantly different except the average length of second belly section recorded at Kasarveli was significantly different from Jaigad and Mirkarwada, while mesh size of seventh belly section recorded at Kasarveli was significantly different from mesh size recorded at Mirkarwada. It was interesting to notice that all the maximum and minimum values for the number of meshes along the length for most of the belly sections were recorded at Mirkarwada, while some of the minimum number of meshes along length of first, second, fourth and seventh belly sections were recorded at Kasarveli. Maximum mesh size recorded for different belly sections of *Disco dol* operated along the Ratnagiri coast were of higher magnitude than the mesh size recorded for different belly sections by other workers [18], [10], [8], [13], [5] along the Indian coast while the minimum mesh sizes recorded during the present study was too low than the mesh sizes reported by them.

The mesh size for cod end section for the *Disco dol* operated from different landing centres did not vary. The cod end mesh size of *Disco dol* was less as compared to the mesh sizes reported by various workers [18], [10], [8], [13] along the Indian coast while mesh size reported by the Neethiselvan and Brucelee [5] was in accordance with that of the present study. The detail specification of *Disco dol* net with eight belly is given in Table 1.

Table 1. Details of specifications of designed Disco dol with eight belly sections

Webbing	Particulars of webbing													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Section/Local name	**Upper fore wing**	**Upper aft wing**	**Lower fore wing**	**Lower aft wing**	**Overhang**	**1st belly**	**2nd belly**	**3rd belly**	**4th belly**	**5th belly**	**6th belly**	**7th belly**	**8th belly**	**Cod end**
Material	High density polythene (HDPE)													
Type of knot	Single trawl net													
Colour	Blue													
Twine size	1.5 to 2.0 mm													
Stretched mesh (mm)	185	185	185	185	185	165	145	125	105	80	60	40	30	20
Upper edge	55	60	50	53	180	174	170	165	170	195	220	206	130	102
Lower edge	-	-	-	-	174	170	165	170	195	220	206	130	102	1
length	40	30	40	25	14	12	10	15	25	50	45	90	125	190
Head rope length- 28-42m, Foot rope length- 32-46 m														

4. CONCLUSION

In general, it is concluded that the mesh sizes recorded during present study for all the sections of *Disco dol* was higher than the mesh sizes reported elsewhere in India. The number of belly sections were more and these increased number of belly sections have played a major role in increase of mesh sizes as well as to maintain wider opening of mouth at the time of operation. Therefore, the higher mesh sizes and increased number of belly sections recorded during the present study are justifiable. The seven belly sections trawl was with lesser mesh sizes and lesser breadth than the eight belly sections trawl net, supports that the fishermen are innovative and interesting in widening the mouth to capture more quantity of fast moving shoaling fishes. The detailed information on the technical specifications and operation of the Ratnagiri fish trawl net would serve as a baseline for any technological changes the net might undergo in the future to improve its efficiency.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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