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Study on Compartive Impact of 28 mm Square Mesh and Diamond Mesh Codends in High Opening Bottom Trawl (Hobt) on Selceted Fin Fishes off Mangalore Coast

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ABSTRACT

Investigations were carried out to study the comparative impact of 28mm square meshes and diamond meshes in codends of High Opening Bottom Trawl (HOBT) on different sizes of dominant fin fishes. The fishing trials were carried out through the M.F.V. Doplhin, a 13.26m OAL wooden stern trawler, fitted with Ruston engine developing 102 BHP at 1800r.p.m.of College of fisheries (UAS) Mangalore. Alternative haul techniques were followed under identical condition to provide the equal chance for both the trawls. The results shown that the 50% of retention lengths of Mackerels and Soles were comparatively found better in high opening bottom trawl (HOBT) with 28mm mesh size square mesh codend and for clupeids (Sardinella spp.) and Silver bellies (Leiognathus spp.) were same in both the codends of square mesh and diamond mesh of same mesh size in high opening bottom trawl (HOBT).

Key words: *High opening bottom trawl (HOBT); Square mesh; Diamond mesh; Finfishes and 50% of retention length.*

INTRODUCTION

The mesh size and shape of codend meshes are selected so as to exploit the desired size groups and avoid capture of smaller ones in order to conserve the fishery resources. Chun Chun *et al*.[1] observed that the diamond mesh becomes narrow at the middle of the codend causing the mesh lumen to be almost closed during trawling and hence the probability of escapement of undersized and juveniles are in remote. Similar Robertson & Stewart[11] observed that the codend when filed assumes bulbous shape and the fish escape through a small area of open meshes in front of the bulb, while forward of this point most of the meshes are stretched and closed. Pope[4] stated that the shape of mesh affects the selectivity of codend. Further; the flow of water also depends on the shape of mesh. Hence for improving the filtering efficiency of mesh, the mesh has to remain open facilitating more water flow and easy escape of young ones of fish.

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This can be achieved by using square mesh codends as this will remain open while in operation. The superiority of square mesh over diamond mesh in facilitating escapement of smaller ones has been proven by many workers[5,6,7,9,11,2,3,12]. The present study is carried out to find out the comparative impact of using square mesh codend and diamond mesh with 28mm mesh size in high opening bottom trawl (HOBT) on some selected fin fishes off Mangalore coast

MATERIAL AND METHODS

Square mesh and diamond mesh codends of 28 mm was fabricated out of 0.75mm (double braided) polyethylene were attached to the throats of 27.28m high opening bottom trawls (HOBT). The dimensions and construction characteristics of nets were shown in figure.1

Flat rectangular otter doors measuring 1500mm x 750mm and weighing 65kg each made up of wood and iron were employed for both the trawls. A set of nine spherical aluminum floats each of 18.2cm diameter and 2.62kgf buoyancy force and equal number of sinkers weighing 50kgs each were used for both nets to get the same buoyancy force and same sinking force respectively. The nets were operated from the M.F.V. Doplhin, a13.26m OAL wooden stern trawler, fitted with Ruston engine developing 102 BHP at 1800r.p.m.of College of fisheries (UAS) Mangalore.

Total twelve comparative hauls were made alternately with square and diamond mesh codends under identical conditions, providing equal chance for both. The catch composition as well as lengths of individuals of different dominant fin fishes obtained during each haul in the square mesh and diamond mesh codends and their co-efficient of variations were recorded.

In order to determine the 50% of retention lengths (i.e.$L_{50\%}$) of dominant fin fishes caught, the length frequency distribution were calculated, where the median lengths of the dominant fin fishes were considered instead of mean lengths because any chances of occurrence of few large size fish in the catch will not affect the medial length.

RESULTS AND DISCUSSION

Table 1 shows the length ranges with their co-efficient variation of some fin fishes caught in 28mm square mesh and diamond mesh codends .Figure 2 gives the percentage cumulative frequency curves for the some fin fishes from which the median lengths ($L_{50\%,}$) are measured. All these curves are of sigmoid or S-shape indicating the normal distribution of finfishes in the length range.

Mackerels (*Rastrelliger kanagurta*):

The length range of mackerel caught in square mesh codend was from 12 to 26cm and in diamond codend was from 10cm to 22cm (Table 2). The ogive curve indicates the median length of mackerel caught in square mesh codend was higher (i.e.15.8cm) than that of diamond mesh codend (i.e.13.8cm), thus, showing that 28mm square mesh can release the smaller one of this species compared to diamond mesh of same size.

Clupeids (*Sardinella spp*.):

The length range of clupeids (*i.e.Sarinella spp.*) remains in the both square and diamond mesh codends ranging from 10 cm to 18 cm .It can be seen from the table 2 that the 50% retention of fishes caught in both codends was around 12.20cm, having same median lengths, thus, it indicates that there no possibility of releasing the smaller one of same species through square mesh and diamond mesh of 28 mm mesh size.

Silver bellies (*Leiognathus spp*.):

Leiognathus spp were caught in lesser numbers with 28 mm square meshes codends. The length ranges of this species caught in both codends are same (i.e.8-16cm) and median length are almost same *i.e.*, around 9.2 cm. (Table 1 and 2). similarly, Kunjipalu *et.al.*[2,3] observed the mean selection length (median length) of *Leiognathus spp* were smaller in 20mm square mesh codend.

Soles (*Cynoglossus.spp*):

Only few numbers of large sized soles were recorded in 28 mm square mesh codend than that of diamond mesh codend. The length ranges of soles caught in square mesh codend are 10-24cm and 10-22cm respectively (Table 1). But the 50% retention lengths (median

lengths) of these species in both codend are same *i.e.*, 11 cm.

However, further studies covering all commercially important species of finfishes are required for optimisation of mesh size with respect fishing areas, in order to provide recommendations and informations to the users that use the square mesh codend as management measure.

Table 1: Length ranges (in cms) of different dominant finfishes caught in square mesh codend and diamond mesh codends of high opening bottom trawl (HOBT)

Name of the finfishes	Length Ranges(in cms) Caught		Co-efficient of Variation (%)	
	Sq.mesh codend	Diamond mesh codend	Sq.mesh codend	Diamond mesh codend
Mackerel *(R. kanagurtha)*	12 -26	10-22	27.2	23.4
Clupeids (*Sardinella spp*.)	10-18	10-18	18.4	18.4
Silver Bellies (*Leiognathus spp*)	8-16	8-16	21.7	21.7
Soles (*Cynoglossus.spp*)	10-24	10-22	25.4	23.4

Table 2: Length frequency distribution of selected finfishes caught in square mesh codend and diamond mesh codends of high opening bottom trawl (HOBT)

Mid Class interval	Mackerel *(R. kanagurtha)*		Clupeids (*Sardinella spp*.)	
	Perectage.Cu.Freqency.		Perectage.Cu.Freqency.	
	Sq.mesh Codend	Diamond Codend	Sq.mesh Codend	Diamond Codend
11	0.0	0.0	22.9	15.8
13	7.3	38.0	61.4	59.2
15	40.0	72.0	94.0	89.5
17	80.0	90.0	100.0	100.0
19	96.4	100.0		
21	98.2	100.0		
23	98.2	100.0		
25	100.0	100.0		
27				

Table 3: Length frequency distribution of selected finfishes caught in square mesh codend and diamond mesh codends of high opening bottom trawl (HOBT

Mid Class interval	Silver Bellies (*Leiognathus spp*)		Soles (*Cynoglossus.spp*)	
	Perectage.Cu.Freqency		Perectage.Cu.Freqency	
	Sq.mesh Codend	Diamond Codend	Sq.mesh Codend	Diamond Codend
9	22.9	25.0	0.0	0.0
11	77.1	76.0	10.6	7.1
13	97.9	89.6	47.0	45.9
15	100.0	100.0	66.7	81.2
17			78.8	94.1
19			84.8	96.5
21			97.00	100.0
23			100.0	
25				
27				
31				
33				
35				
37				

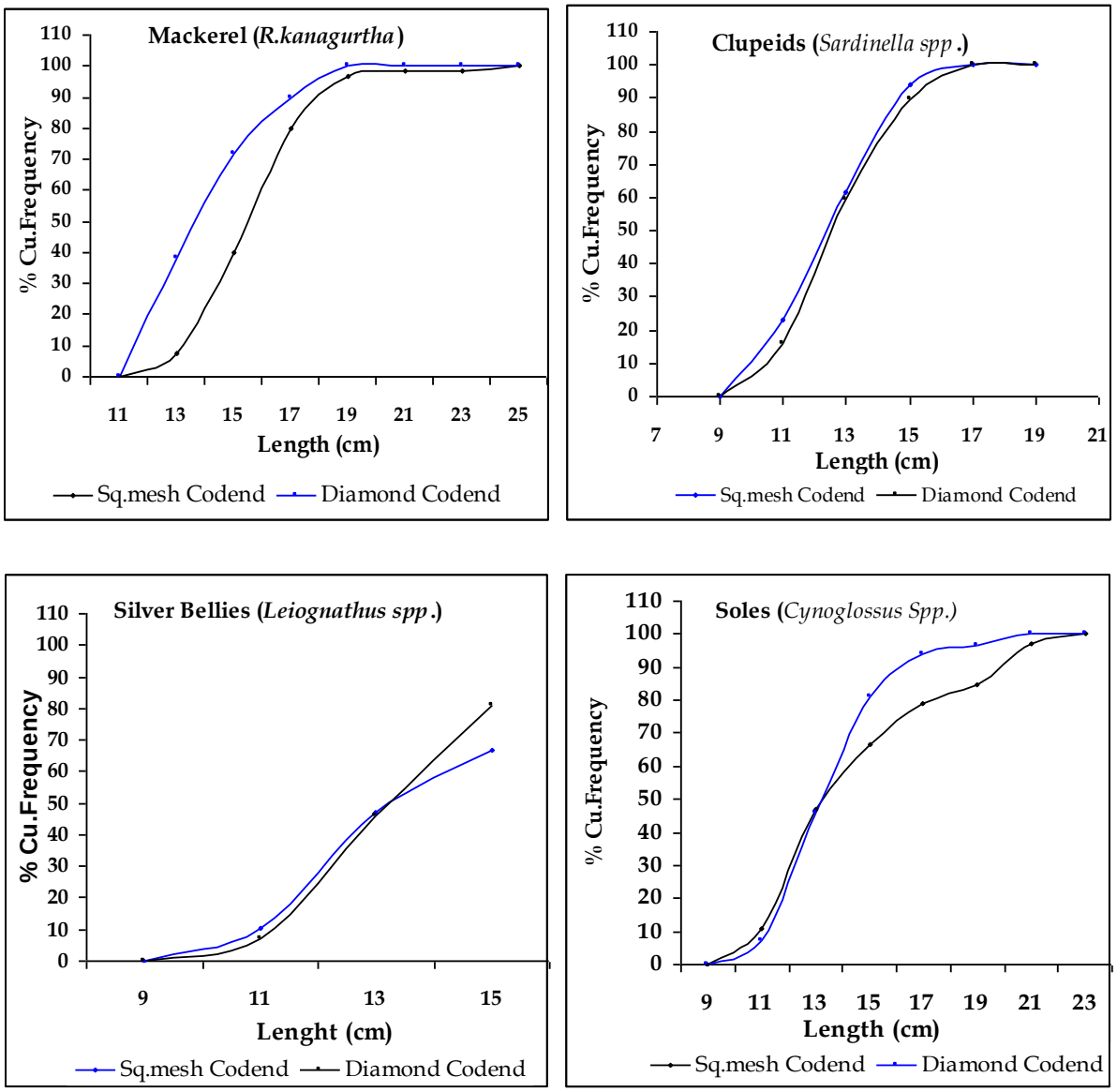

Fig. 2: Percentage cumulative frequency curves for few dominant finfishes caught in square mesh and diamond mesh codend

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