

# NOTE ON THE SIZE GROUPS OF PRAWNS LANDED BY SHRIMP TRAWLS OF FOUR DIFFERENT COD END MESHES

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[A study on the different size groups of prawns caught by four shrimp trawls having different cod-end meshes was made by the author. The results indicate that small sized prawns of mean length 77.15 mm. were captured by the net having 23.38 mm. cod-end at 5-6 fathoms depth, medium prawns of mean length 105.22 mm. was caught in 25.21 mm. and 19.88 mm. cod-end at 8 fathoms depth and big sized prawns of mean length 117.98 mm. were caught in 21.29 mm. cod-end.

Further the relation of length on breadth of prawn is worked out to be :

$$B_p = 0.15 L_p - 1.50 \text{ where}$$

B<sub>p</sub> and L<sub>p</sub> are breadth and length respectively.]

## Introduction

With the increased commercial trawling for prawns off Cochin region, the time may rapidly approach to have a minimum mesh size of the cod of trawl nets in order to have a sustained yield and to save the immature stock. With a view to understand the availability of the size groups of prawn population off Cochin as caught by the different trawls having different cod end meshes, certain preliminary investigations were carried out in the month of May, 1961 and the findings are incorporated in this note.

## Methods

Four entirely different designs of trawl nets having different cod end meshes, operating under normal commercial fishing conditions were selected and the data were collected on the days when all the nets were working from their trawlers in their respective fishing grounds. The size of the nets and the details of the cod ends are represented in Table I.

TABLE—I. SPECIFICATIONS OF THE TRAWLS AND DETAILS OF THE COD ENDS

<i>Type and head-rope length of the trawl</i>	<i>Details of the cod end</i>		
	<i>Material used and the specifications</i>	<i>Type of the knot</i>	<i>Designed mesh-size in mm. (Stretched measure)</i>
1. Four-seam overhang net of 93.5'	Cotton of 12 to 15 threads	Single trawl	31.75
2. Four-seam net of 60.0'	Cotton 20/15/3	Single trawl	25.40
3. Four-seam overhang net of 45.0'	Nylon 210/6/3 in double strength	Double trawl	25.40
4. Four-seam non-overhang net of 25.0'	Cotton 20/8/3	Single trawl	27.94

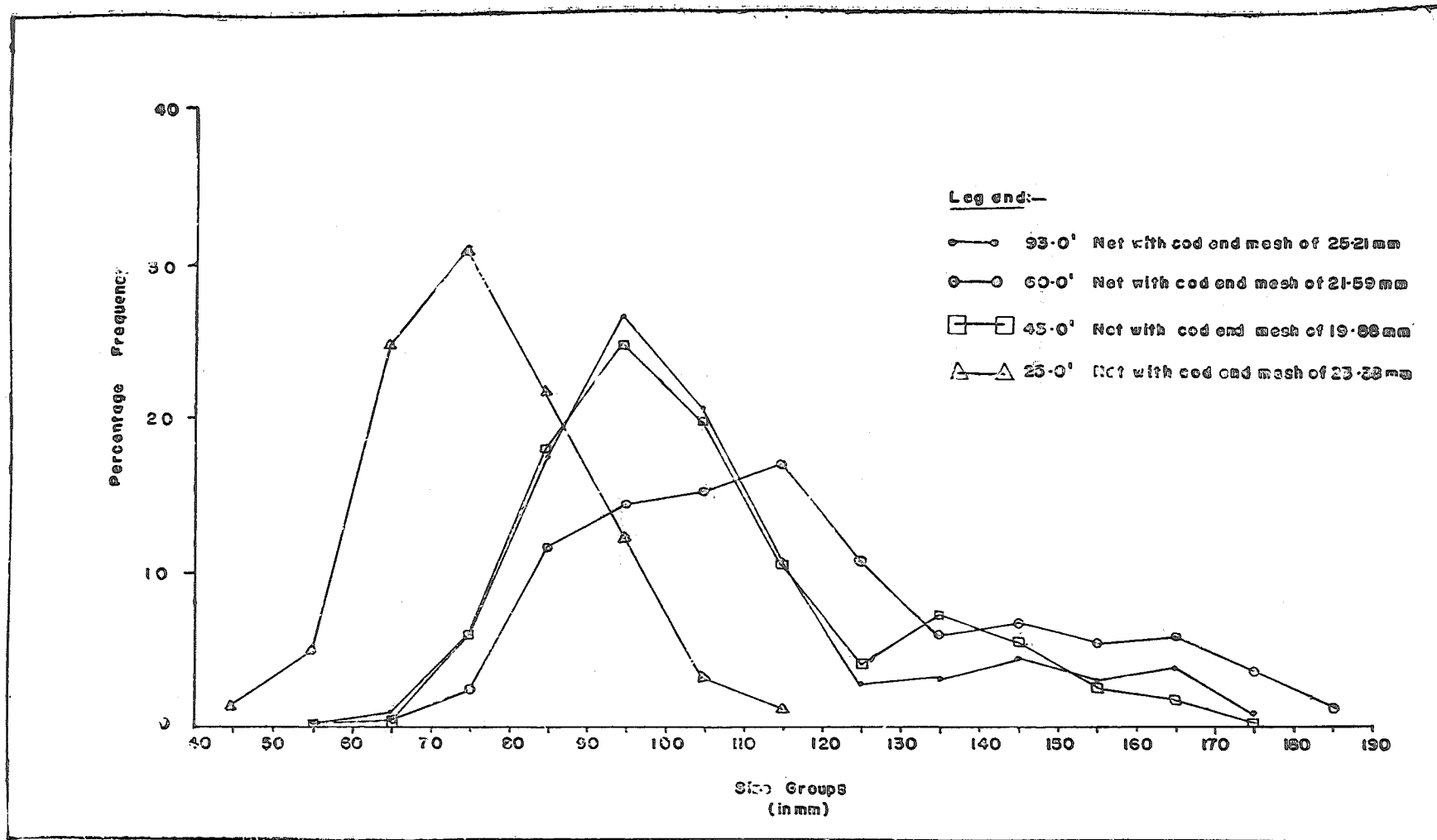


Fig. 1: Percentage frequency distribution of Frawns as caught by different cod end meshed nets.

From the total catch of each net, a sample of 3 kg. representing a kilogram each of big, medium and small prawns, was drawn and the body length from the posterior end of the rostrum to the anterior end of the telson, of all the individual prawns were measured. At least 25 meshes for each net selected at different portions of the cod end in wet condition were measured. The mesh measurement included the stretched length between the inside of the two knots i.e. space occupied

by two legs and a knot. Further for the 20% of the sample of prawns collected in each day, the breadth at their maximum were also recorded. The nature of the bottom and the depth of operation in each case were noted daily.

### Results and Discussion

The percentage frequency distribution of the cod end mesh measurements in wet condition of the four trawls are indicated in Table II.

TABLE—II. PERCENTAGE FREQUENCY OF MESH SIZE OF COD ENDS OF FOUR TRAWLS

Mesh size (mm)	% Frequency in			
	93.5' net	60.0' net	45.0' net	25.0' net
16	..	..	1.5	..
17	..	..	7.3	..
18	..	..	15.3	..
19	..	..	22.7	..
20	..	12.8	13.2	..
21	..	36.8	18.2	..
22	..	34.4	16.0	11.6
23	4.0	10.4	5.1	42.3
24	33.0	5.6	0.7	42.3
25	25.0	..	..	3.8
26	17.0	..	..	..
27	17.0	..	..	..
28	4.0	..	..	..
Mean (mm)	25.21	21.29	19.88	23.38

The percentage frequency distribution of the prawns caught in the above four nets with different cod end mesh sizes are shown in Fig. 1 and the results of the statistical analysis of the data are presented in Table III.

TABLE — III. LENGTH FREQUENCY DISTRIBUTION OF PRAWNS AS CAUGHT IN DIFFERENT TRAWLS OF DIFFERENT MESH SIZED COD ENDS

Types and size of trawls and de- signed mesh size	Mean mesh size of cod end (mm)	Size ranges of length of prawns in the sample (mm)	Mean length in (mm)	Calculated mode (mm)	
93.5' four-seam trawl (31.75 mm)	25.21	55 to 175	105.17	104.35	3.71
60.0' four-seam trawl (25.40 mm)	21.29	64 to 188	117.98	117.39	5.21
45.0' four-seam trawl (25.40 mm)	19.88	56 to 172	105.22	104.45	4.05
25.0' four-seam trawl (27.94 mm)	23.38	42 to 117	77.15	76.74	2.70

The usual depth ranges in which each of the nets were commercially operating, along with the depth, where maximum fishing effort was put in, are given in Table IV.

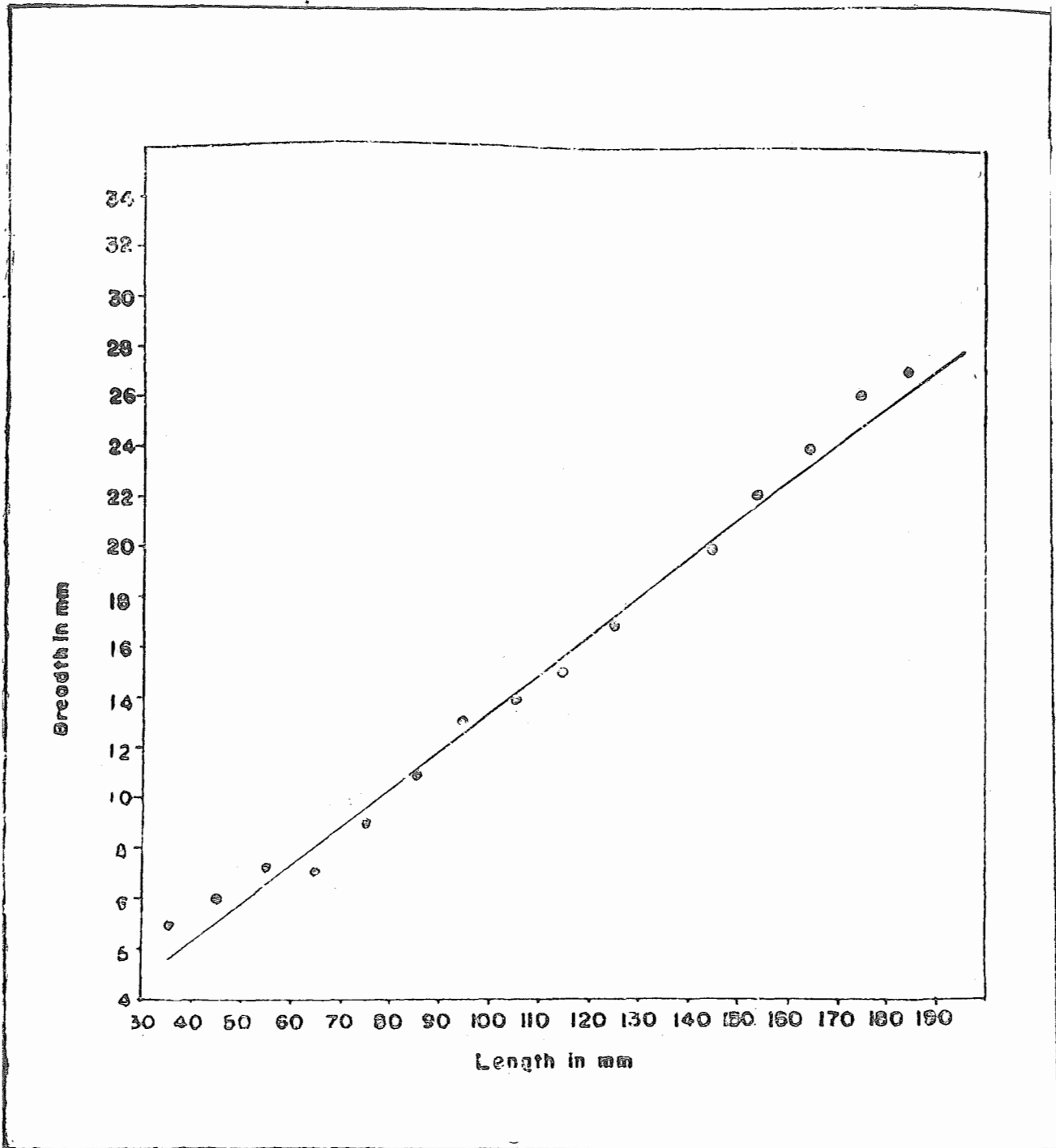


Fig. 1. Percentage frequency distribution of prawns as caught by different cod end meshed nets.

TABLE—IV. USUAL DEPTH RANGES AT WHICH THE NETS ARE OPERATING

Name of the net and its size	Mean mesh size of the cod end (mm)	Depth of operation	
		Range during the investigation period (fm)	Depths where maximum fishing effort was put in (fm)
93.5' four-seam	25.21	7 to 11	7 to 8
60.0' four-seam	21.29	7 to 15	10 to 12
45.0' four-seam	19.88	7 to 10	8
25.0' four-seam	23.38	4 to 8	5 to 6

Fishing with all the nets was conducted towards the southern side of the mouth of the channel and on the muddy bottoms.

(1) *Size group of prawns caught with respect to the mesh size at the cod end of the trawls:* It is evident from Fig. 1 that major quantities of small sized prawns were caught in the 25' four-seam net having the mean mesh size of cod end at 23.38 mm. The mean length of prawns referred to above was 77.15 mm. The medium sized prawns with mean lengths of 105.77 and 105.22 mm. were captured by the 93.5' and 45.0' four-seam nets respectively whose mean mesh size of cod ends were 25.21 and 19.88 mm. Even though the cod end meshes of these two nets differed, the trend of the size groups of prawns obtained was almost similar, which may be due to that both the nets were operating in the same area. Similarly bigger sized prawns of mean length 117.98 mm. were obtained in 60.0' trawl net with 21.29 mm. cod end mesh.

(2) *Size groups in consideration with the depth of operation:* Taking into consideration the depth of the area where maximum fishing effort was made and the size restrictions of shrimp caught in the different cod end meshed nets, it is clear that during the period of investigation, small sized prawns were available in shallow waters upto 6 fathoms, medium sized ones between 7 and 8 fathoms and big sized prawns at 10 to 12 fathoms, which is evidenced from Table IV, as the 60' net was working at 10 to 12 fathoms, while the operation of 25' net was restricted to 5 and 6 fathoms. The other two nets were operating in between, with maximum concentration at 7 and 8 fathoms.

If the modal size of prawns caught in each of the nets during the period represents

the general size of prawn population available at these particular depths of fishing ground, where maximum fishing was done, and since the mean size is affected by the single smallest of the small or largest of the big one, modal size can be taken as a most representative measure, then it can reasonably be said that at 5 to 6 fathoms, depth, smaller sized prawns of modal length 76.74 mm., at 8 fathoms depth, the medium size having the modal length of 104.35 to 104.45 mm., while at 10 to 12 fathoms comparatively large sized prawns of modal length 117.39 mm. are available which is clear from Tables II and III.

(3) *Relation of length and breadth of prawns caught during the period of investigation:* As indicated already, from the sample of prawns collected for length measurements, 20% of them were systematically measured for its breadth at their maximum. Every fifth prawn was taken for breadth measurement as length measurement proceeded. About 726 numbers were measured which represent the catch of all the nets operating during the period.

On analysing the data by putting it in the form of a Bivariate frequency table and working out the correlation between the length and breadth, it was found that the value of co-efficient of correlation is 0.93, which indicates a very high correlation. Hence a scatter diagram was drawn for the grouped data by means of which, the linear relationship between the length and breadth has been established.

The regression equation of breadth on length was derived by the principle of least squares, the statistical method commonly used, and is represented in Fig. 2.

The worked out and best fitted equation is represented by the following:—

$B_p = 0.15 L_p - 1.50$  where the regression co-efficient between the two measures is 0.15. Here  $B_p$  and  $L_p$  represent the breadth and length of the prawns in mm.

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