

# EXPLORATORY SURVEY ALONG THE SOUTH-WEST COAST OF INDIA WITH REFERENCE TO THE USE OF TRY-NET

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## ABSTRACT

The results of an exploratory survey for the assessment of prawn resources conducted along the south-west coast of India for a short period in 1967 are presented. The trend in total catch as well as prawn catch showed a decrease from the beginning to the end of the survey. During the survey, besides two trawl nets, a small try-net was also used for testing the grounds. A non-parametric test was applied to the catches by the two types of nets, the trawl net and the try-net, and it was found that the catch efficiency of the nets was the same. The possibility of using such a try-net for exploratory surveys and also for testing the grounds during commercial trawling is discussed.

## INTRODUCTION

In India, the need for exploratory investigations for the assessment of the fish stock and also for finding out new fishable grounds has been highlighted from time to time. Several systematically organised surveys have been conducted in the Indian waters from the beginning of this century and these have been reviewed by Rao (1969) and Silas (1969). The present paper deals with the results of a short-term exploratory fishing survey conducted during September—November 1967 along the south-west coast of India. It also examines the possibility of recommending try-nets for the purpose of exploratory surveys for the assessment of demersal fishery resources, particularly the prawns.

## THE SURVEY AND ITS RESULTS

From September to November 1967 a resources survey for prawns was conducted by the Union Carbide Company along the south-west coast of India mainly concentrating in an area off and north of Quilon, Kerala (Fig. 1). The aim of the survey was to estimate the magnitude of commercially important prawns along the south-west coast of India and, if the results obtained were encouraging, to start a prawn-processing industry in India. The survey, though not perfect in all the aspects, was useful in understanding the trend in the abundance of the prawns at one part of the year in this region. An area of more than 500 sq. km was covered during the investigations using a mechanised steel trawler of 18.3 m length, 5.5 m beam and 1.8 m draught, fitted with a 170 h.p. engine having a cruising speed of 15 km per hour. The trawling speed was maintained at 6 km per hour. Two Gulf of Mexico

shrimp trawls (head rope-18.3 m, cod end mesh stretched - 40 mm) were operated from both sides of the vessel at the same time with outriggers. Besides, a try-net of about 4 m length with mesh sizes of 25 - 30 mm and otter boards each measuring 75 x 50 cm was also used for testing the grounds and also for estimating the prawn resources.

The vessel worked along the depth contours between 16 and 51 m. The trawling grounds were mostly muddy or sandy mixed with mud. Each trawling operation using the shrimp trawls lasted from one to two hours and sometimes more depending on the trend of the catch. This was ascertained from the catch by the try-net which was operated for short durations of 5 to 15 minutes along with the shrimp trawls.

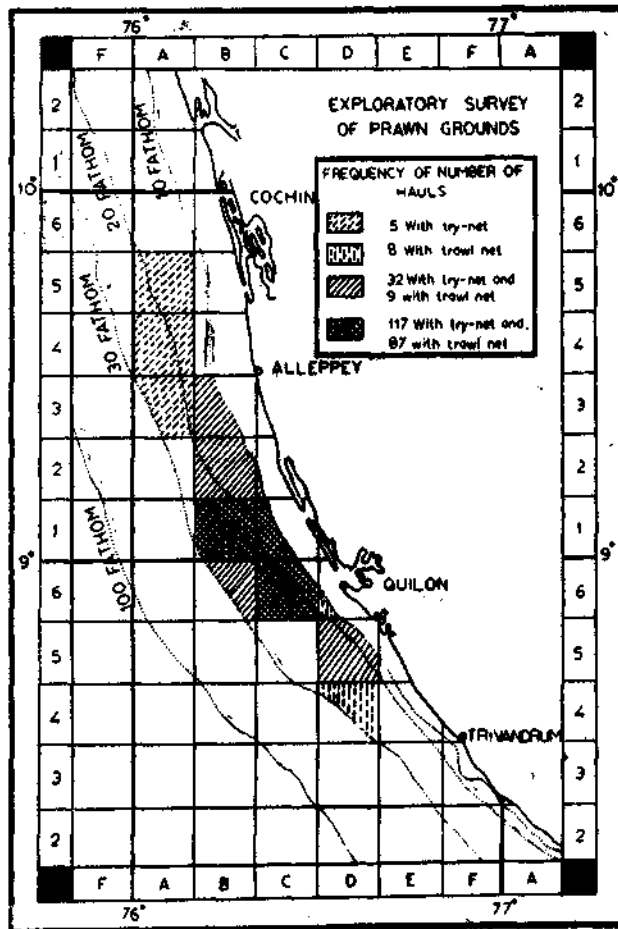


FIG. 1. Areas surveyed with both the Mexican trawl and the try-net during September--November, 1967.

### *Catch composition*

From an analysis of the trawl catch it was found that the fish community was typical of commercial grounds along the south-west coast of India but the frequency of occurrence of each group varied from cruise to cruise. During September *Nemipterus* spp., mainly *N. japonicus*, dominated over all the other groups. Next in importance were the prawns. The stomatopod *Squilla nepa* and crabs, with a variety of species, were also well represented. However, during the subsequent cruises there was a marked change in the catch composition, the crustacean fauna being dominant. During November the total catch as well as the prawn catch showed a decline, and off Alloppey the prawns were totally absent.

### *The prawn catch*

From the data collected from the try-net catch the area-cum-depth-wise and a depth-wise distribution of prawn grounds were determined (Table 1). The results show that during the cruise in September the areas in the depth zones between 36 and 38 m were comparatively richer in prawns over those zones fished between 26 and 35 m. During the cruise in October the results were quite the reverse as the hauls taken from deeper waters (35-46 m) brought comparatively very little prawns. During the cruise in November most of the trawlings were carried out in deeper waters and within the area fished it was found that no particular depth zone was good for prawns. On the whole the trend in prawn catch decreased from September to November (Table 2).

An area-wise analysis of the shrimp catch with the try-net revealed that during the September cruise, areas towards the south (9-76/1C, 2B and 8-76/6C), were more fertile for prawns in all the depth zones. During the October cruise a north-to-south difference in the abundance of prawns was not very significant. However, during the November cruise attempts made towards the northern parts were quite futile in that the trials made in 9-76/3A and 4A did not result in prawn catches. In 9-76/1B and 3B the prawns were present but in meagre quantities. Area 9-76/2B was an exception as 0.25 kg of prawns for the 10-minute haul was caught in the try-net. Areas south of 9°N (8-76/4D, 6B, 6C) were comparatively richer in prawns.

Principally six species of prawns, namely *Penaeus indicus*, *P. monodon*, *Metapenaeus dobsoni*, *M. affinis*, *M. monoceros* and *Parapenaeopsis stylifera* were present in the trawl catches. The quantity of the prawn caught and the frequency of occurrence of each species varied considerably during each cruise.

### USE OF TRY-NETS FOR EXPLORATORY FISHING SURVEYS

The most significant part of the present survey was the use of the try-net. The try-net when used was in continuous operation both day and night; each haul lasted from 5 to 15 minutes or sometimes even more and the time lapse between two successive hauls was about 5 minutes only. The catch from the try-net was immedia-

TABLE 1. *Area-cum-depth-wise and depth-wise catch of prawns with the try-net*

Date and depth range	Area covered	No. of samples	Catch per 10 minutes haul (in kg)			
			Area-cum-depth-wise		depth-wise	
			Total	Prawns	Total	Prawns
<b>9—12 Sept. 1967</b>						
26-30 m	9-76/5A	2	1.00	—		
"	9-76/4A	1	1.00	1.00		
"	9-76/3A	3	17.63	0.89		
"	9-76/2B	3	7.76	7.59	10.43	3.66
"	8-76/6C	1	10.00	5.00		
"	8-76/5D	1	4.00	—		
30-35 m	9-76/3A	2	5.07	0.07		
"	9-76/2B	3	4.00	3.43	5.89	3.71
"	9-76/1C	1	12.00	11.67		
35-38 m	9-76/3A	1	3.50	—	14.98	4.54
	9-76/2B	6	16.25	6.15		
<b>22—27 Oct. 1967</b>						
16 m	9-76/3B	1	2.00	0.50	2.00	0.50
27-30 m	8-76/6C	12	4.95	0.21	4.95	0.21
30-35 m	9-76/1C	6	4.15	0.26	4.15	0.26
35-40 m	9-76/1B	13	4.59	0.14		
"	9-76/1C	9	5.35	0.24	3.79	0.14
"	8-76/6C	13	2.48	0.09		
40-46 m	9-76/1B	16	2.67	0.14		
"	9-76/1C	4	3.30	0.07	2.87	0.14
"	8-76/6C	34	2.92	0.14		
<b>12—17 Nov. 1967</b>						
30-35 m	9-76/4A	4	5.00	—	5.17	0.08
"	8-76/5D	3	5.33	0.16		
35-40 m	9-76/2B	2	7.00	0.25		
"	9-76/3B	8	5.15	0.01		
"	8-76/6C	5	2.18	0.08	4.25	0.09
"	8-76/5D	3	5.33	0.16		
40-45 m	8-76/6C	4	3.69	0.06	3.69	0.06
45-51 m	9-76/1B	5	2.42	0.01		
"	9-76/3A	2	12.10	—	5.67	0.13
"	8-76/6B	2	5.20	0.24		
"	8-76/6C	1	10.00	0.10		

TABLE 2. *Details of catch made with the shrimp trawls*

Duration of cruise	Area covered	No. of hauls	Total fishing hours	Depth range (m)	Average total catch/hr trawling (kg)	Average prawn catch/hr trawling (kg)
9—12 Sept. 1967	9-76/2B 8-76/6C	5	7.25	35-45	551.72	147.00
22—27 Oct. 1967	9-76/1C 9-76/1B 8-76/6C	32	63.16	27-46	340.40	42.04
12—17 Nov. 1967	9-76/3B 8-76/6B 8-76/6C 8-76/6D 8-76/4D 8-76/5D	29	68.48	25-47	237.27	14.40

(The calculations are made for both the trawl nets operated at the same time.)

tely analysed for percentage composition and weight of prawns and other relevant details noted. The aim of these observations was to compare the catch efficiency of the two types of nets, namely the trawl net and the try-net and to see whether a try-net could be used in the place of a large trawl net for exploratory purposes. The comparison was made on data collected when both types of nets were operated together in the same ground. However, 1 to 5 hauls were made with the try-net within the time taken for one haul with the commercial trawl net.

In 34 hauls of observation made with the shrimp trawl, the total catch was 14,500 kg in 68 hours and the catch per hour was 213.2 kg. Similarly the total catch in 115 try-net hauls which coincided with the commercial trawling was 987 kg in 46 hours and the catch per hour was 21.5 kg.

In order to assess whether the two nets reflected the variations in the catches alike, it was sought to find out if the catches by one net varied proportionately with the other. The bar-diagram (Fig. 2) showing catch per minute by the two types of nets revealed a parallel increase or decrease except for a few values which may be due to operational errors.

This was further checked as follows: If X denotes the catches by the smaller net and Y those by the larger and if the catches by one net are proportional to those by the other, the ratio  $Y/X$  must be a constant. Most of the values for  $Y/X$  were

found to fall around 8. Since ratios are considered, the geometric mean was worked out to represent the constant  $Y/X$ . This also reduces undue influences by isolated higher values. The geometric mean was found to be 8.5.

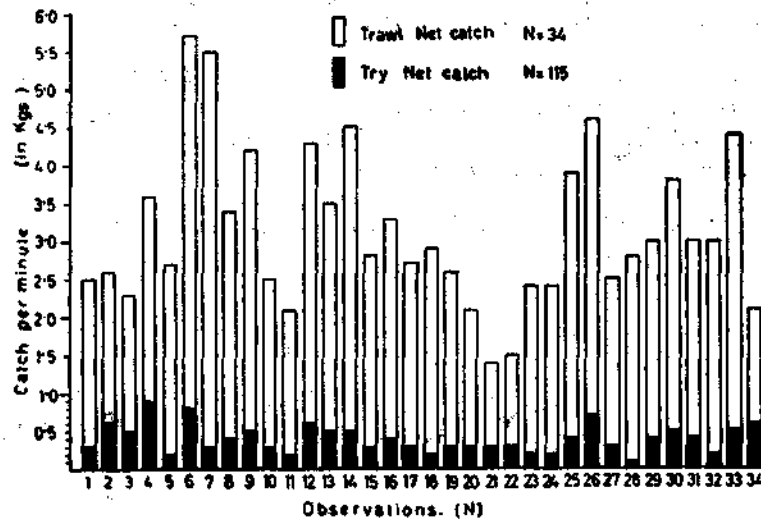


FIG. 2. The relationship between the Mexican trawl and the try-net catches.

Each of the two values for  $X$  and  $Y$  for a pair came under homogeneous conditions. If  $Y/X$  is to take a constant value of about 8.5, then the differences  $8.5X - Y$  is to be symmetrically distributed about a mean of zero. The sign test was carried out to test this (Dixon and Mood, 1946). The signs of  $8.5X - Y$  were obtained for all the 34 pairs of observations. There were 16 negative signs. Since even at 25% level of significance the number of less frequent signs for 34 pairs of observations is 13, it is clear that the catch efficiency of the two types of nets is the same.

#### DISCUSSION

For a rapid survey and for getting a fairly accurate picture of the extent of the fishable grounds of demersal fish stocks the use of such try-nets can be suggested in the place of large trawl nets as seen from these surveys. They help to get fairly reliable information about the richness of the fishing grounds. It is clear that the trawl net need be operated only if the catch by the try-net proves satisfactory. Also when fishing with the trawl net, the try-net may be used simultaneously because during one fishing operation lasting for about 2 hours with the trawl net, 4 to 6 try-net operations can be made and the catch by the try net would give information about the catch being made by the trawl net so that the time to be given for a successful trawling operation can be determined. The purpose of this paper is to emphasise the use of try-nets in all exploratory trawl surveys, as well as in commercial trawlers, as they save time, effort and money. Moreover, the extent of the fishing grounds

vary and trial trawlings lasting for short periods with small try-nets would help to get a synoptic picture of the catchable fish stock present. An added advantage is that information on bottom conditions and benthos can also be obtained from the try-net catches. Besides, the use of try-nets allows numerous shorter hauls of 5 to 10 minutes duration to be carried out over a large area.

In India since there is an impetus for increased fish landings mainly by trawlers, rapid surveys of our potential demersal fishery resources are necessary. For a quick assessment the use of suitable try-nets in future surveys is imperative as they would be economical and time-saving.

It may be mentioned here that in view of the encouraging results obtained during these surveys, the Union Carbide Company has started a commercial venture for prawn fishing in the Indian coastal waters.

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#### REFERENCES

- DIXON, W.J. AND A.M. MOOD. 1946. The statistical sign test. *J. American Stat. Ass.*, 41: 557-566.
- RAO, K. VIRABHADRA 1969. Distribution pattern of the major exploited marine fishery resources of India. *Bull. cent. mar. Fish. Res. Inst.*, 6: 1-69.
- SILAS, E.G. 1969. Exploratory fishing by R.V. *Varuna*. *Bull. cent. mar. Fish. Res. Inst.*, 12: 1-86.