PRAWN FISHING BY M. F. V. JHEENGA IN BOMBAY WATERS

PRADIP TAGORE

Government of India, Deep Sea Fishing Station, Bombay.

[The design and construction of the motor fishing vessel 'Jheenga' of the Deep Sea Fishing Station of the Government of India, Bombay, the areas covered and the gear used by her in 1959-'63 are described.

The prawn catches in relation to the total catches, and their catch rates in different months in area 18-72 in Bombay region which was fished continuously during the five years period have been studied with a view to ascertaining their seasonal abundance. The results indicate the availability of the prawns in the region for the major part of the year from March to October-November. High catches with high catch rates forming high percentage of their abundance in total catches are obtained in July to October.]

Introduction

Intensive fishing if offshore areas along the Indian coasts is one of the surest ways of increasing the much needed food supply. To achieve this object, large vessels adequately equipped with storage facilities are felt necessary to brave the changing weather conditions, to remain out of ports for considerable periods, to operate bigger nets in deeper waters and to keep the catch in good condition. In 1946, a decisive step was taken in this direction by the Government of India, Ministry of Food and Agriculture by establishing the Deep Sea Fishing Station at Bombay, which started exploratory fishing operations with a steam trawler 'Meena'. Subsequently a fair number of other trawlers were added and the operations were extended to other regions like Cochin, Mangalore, Tuticorin and Visakhapatnam. The details of fishing operations with particular reference to prawn catches in the total catches of all fish landed by one of the Motor fishing vessels, which arrived in 1959 as a shrimp trawler and was appropriately christened 'Jheenga' to mean a 'shrimp' in the local language.

Methods

The vessel now employed for conducting otter trawling was after the model of the popular shrimp trawlers of the Gulf of Mexico, and was received by the Superintending Engineer, Deep Sea Fishing Station, Bombay, in February 1959 under the T.C.M. Aid Programme.

The special features of the vessel were the two out-riggers. These outriggers were fitted to each side of the mast and were intended for operating one net at a time from each out-rigger. Topping lift arrangements from the main mast enabled both outriggers to be dropped outboard nearly parallel to the sea and these were prevented from any movement aft by means of stopper stays on the forward port and starboard gunwales. The starboard side outrigger was 5½" in diameter and 17' in length. This was fitted with two 'U' rings for holding the two blocks. The trawling cables from the two drums of the winch passed through two blocks of the outrigger and were connected to the otterboards. The portside outrigger slightly smaller in length, about 4½" in diameter and 15' in length had only one block for operation of a try net with the help of a single wire from the third winch drum. The aft deck was completely open to provide sufficient working space. During the course of initial and subsequent operations for using other types of gear, the deck fittings were considerably altered.

General Particulars of M.F.V. 'Jheenga' (Plate 1)

Type Mexican Shrimp trawler with transom stern
Place of construction Holland
Year of construction 1958
Length (O.A.) 55′ — 5″ (16.92 m.)
Beam 17′ — 9″ (5.41 m.)
Draft loaded 7′ — 8½″ (2.34 m.)
Displacement 15.70 tons
Gross tonnage 48.67
Fish hold capacity 800 cft.
Gear Storage 46 cft.
Fuel 1,400 gallons
Main Engine Make & Type Caterpillar D342 six in line 4-stroke Diesel

Main Engine

B. H. P. 153
Auxillary Engine Make and Type Single cylinder Lister Freedom Range 4 stroke diesel

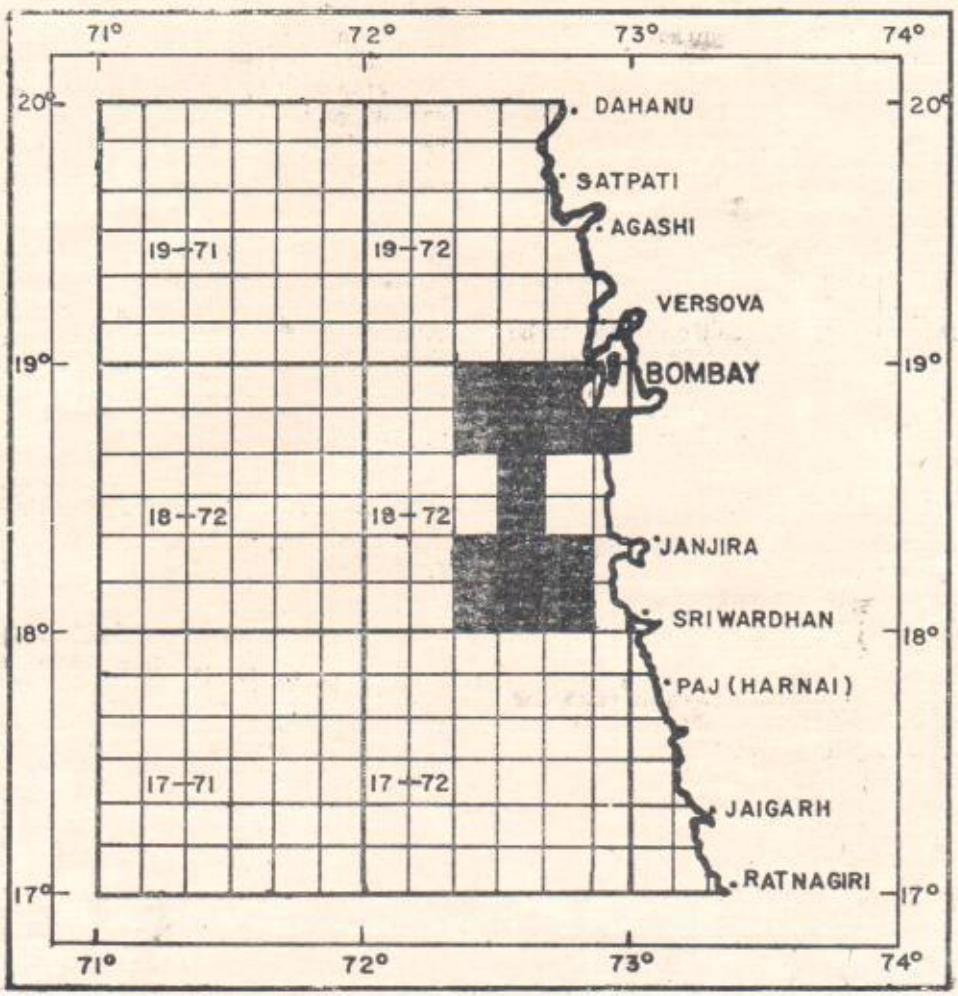
Auxiliary Engine

B. H. P. 9.4
Winch Make and Type Strousberg 3-drum winch, mechanically driven and with pedestal brakes
Drum capacity 175 fms.
Warp Galvanised flexible steel 6/19 construction 12 mm. dia.
Echo sounder Kelvin Hughes HA/66/RTA/BL

Particulars of Gear used: Various types of nets were used during the period of observations, viz., Semi Balloon type, Box net, 2-Seam trawl nets, Russian trawls and Hoover trawls. The design and construction details are given in Table I. As these nets were operated not simultaneously, but only in different periods in different sub-areas, it is not possible to judge their comparative efficienccy.

Areas fished, Period of Operations, and Results Obtained: During the period 1959-'63 'Jheenga' was fishing in the major areas 16—73, 17—72, 18—72, 19—71, 19—72, 20—69, 20—70, 20—71, 21—69, 21—70, 22—69 and 22—70 between latitudes 16° and 23°N in Bombay-Saurashtra waters. Each of these major areas is 60 miles by 60 miles and divided into 36 subareas, each of 10 by 10 miles (Fig. 1).

While fishing operations were conducted only off and on in most areas, the major area 18-72 was constantly fished for more than 7 months every year from 1959 to 1963 and the data of the catches are given in Table II. The number of operations in a month varied, depending on the weather conditions, satisfactory functioning of the engine, winches etc., and the distance to be covered between the base and the fishing grounds. On each day of operation 3 to 8 hauls of 60 to 90 minutes duration each were made from depths ranging between 10/45 meters. The nature of the bottom, the atmospheric temperature, the surface temperature of the waters, the actual depth at which each haul is made, the type



of gear used with related particulars of length of warp, number of floats, the trawling speed etc., and the composition of the catches were recorded as shown in Table II.

Particulars of prawn catches in relation to total catches from area 18-72 for the years 1959 to 1962 fished by 'Jheenga' are given in Table II. In 1959, the catch rates, percentage and also the total quantity of prawns landed were the highest in October, being 123 kg. per hour, 27% and 8448 kg. respectively for an effort of 69 hours. It may be seen from the table the prawn catch showed an increase from March onwards upto October but thereafter a decline. In December both the catch rate and the percentage of prawns were the lowest.

In 1960 as in the previous year, in the month of March a increase in prawn catch was seen when the percentage was 23 and the catch rate was 12 kg. per hour, but there was a decline by May. Again an increase was seen in June and the catch rose up in subsequent months. The highest catch per hour of 52 kg. was in August, but the highest catch was in September. In general very high catch rates were recorded from August to November. The percentage of prawns in the total catch started coming down from October; in December both the catch rates and the percentage were very low and continued to be so through January of the following year.

In 1961 there was no prawn catch in February to April. The catch and catch rates did not show any appreciable increase till August. In that month and the next there was slight increase in catch and catch rates. In October the highest catch for the year viz. 1576 kg. forming 9.7% was obtained with a catch rate of 26 kg. per hour. November and December showed a decline in prawns catch as in the previous years.

In 1962 also the highest catch rates and the highest catches were in October. From January to April, prawn landings were nil. November and December months again recorded low catches.

In 1963, the highest catch rate of 31.3 kg. per hour was in September. In October the highest catch of 1220 kg. was obtained for an effort of 65 hours at 18.7 kg. per hour. The catch rates were high from July to October but declined in the subsequent months.

From the preceding account it may be seen that in general in area 18-72 the catch rates, the catches as well as their percentages in the total catches are high from July to October. The yields in November are low and from December to February are the lowest, but show a slight increase from about March and in some years fairly good about May-June.

As the above observations of the prawn catches indicate their availability in the region for the major part of the year from March to October-November, it is the opinion of the author that by introducing effective shrimp gear, the prawn landings could be substantially increased to meet the demand for local as well as foreign markets.

Acknowledgements

The author expresses his gratitude to Shri S. Miskeith, Superintending Engineer, Deep Sea Fishing Station for according permission to make use of the data from the log-reports and for the kind encouragement given in presenting these reports.

References

1. Panikkar, N. K. & Menon, N. K., *Proc., I.P.F.C., III,* (1955).

2. Rai, H. S., *J. Bombay nat. Hist. Soc. 36,* (1933).

3. Shariff, A. T., Survey of the Offshore demersal Fisheries of Andhra and Orissa Coasts, 1960, (1961).

4. Srivatsa, K. R., Fisheries Development in Gujarat — Souvenir Gujarat — Fisheries, (1961).

TABLE I

PARTICULARS

Parts	4-Seam Semi Balloon Trawl				Hoover Trawl			
	Breadth in meshes	Length in meshes	Mesh size (m.m.)	Pieces	Breadth in meshes	Length in meshes	Mesh size (m.m.)	Pieces
Head Rope	—	45	—	—	—	64	—	—
Foot Rope	—	57	—	—	—	80	—	—
Upper wing	—	—	—	—	75 to 10	53	125	—
Lower wing	—	—	—	—	35 to 20 to 20	87	137	2
Upper wedge	55 to 55	80	50	2	—	—	—	—
Lower wedge	55 to 15	200	50	2	—	—	—	—
Square	—	—	—	—	230 to 300 to 250	34	87	1
Upper Jib	80 to 1	160	50	2	—	—	—	—
Lower Jib	70 to 1	140	50	2	—	—	—	—
Upper belly No. 1	320 to 54	200	50	1	250 to 160	45	75	1
Upper belly No. 2	—	—	—	—	160 to 100	30	75	1
Upper belly No. 3	—	—	—	—	100 to 100	35	75	1
Upper belly No. 4	—	—	—	—	100 to 60	30	62	1
Lower belly No. 1	250 to 54	148	50	1	150 to 110	40	87	1
Lower belly No. 2	—	—	—	—	110 to 100	25	75	1
Lower belly No. 3	—	—	—	—	100 to 100	35	75	1
Lower belly No. 4	—	—	—	—	100 to 60	30	62	1
Extn. piece	—	—	—	—	—	—	—	—
Intermediate	140 to 140	160	50	1	—	—	—	—
Cod end	140 to 140	127	38	1	60 to 60	33	62	2

1. Material used	Nylon	Manila
2. Floats		18 to 20 nos. ($6\frac{1}{2}$" dia.) Aluminium Burgancy 3·6 lbs.
3. Weight		60 kg. ($\frac{3}{4}$" Chain)
4. Head/foot ropes		Combination Rope 9/16"
5. Otter board	Rectangular type 142 kg.	Rectangular type 175 kg.
6. Half bobbin Danlino and butterfly	—	—

OF GEARS USED

"Meena" Trawl				Box Net				15-metre Russian Trawl			
Breadth in meshes	Length in meshes	Mesh size (m.m.)	Pieces	Breadth in meshes	Length in meshes	Mesh size (m.m.)	Pieces	Breadth in meshes	Length in meshes	Mesh size (m.m.)	Pieces
—	58'6"	—	—	—	119'6"	—	—	—	16 metre	—	—
—	67'4"	—	—	—	119'6"	—	—	—	23·6 „	—	—
56 to 28	112	75	2	90 to 1	180	50	2	56 to 21	45	70	2
60 to 24	144	75	2	90 to 1	180	50	2	31 to 5	78	70	2
—	—	—	...	75 to 75	90	50	2	—	—	—	—
—	—	—	—	75 to 1	150	50	2	—	—	—	...
180 to 180	30	75	1	—	—	—	—	154 to 112	33	70	1
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
180 to 100	80	—	1	360 to 120	180	50	1	112 to 96	24	60	1
100 to 75	25	50	1	—	—	—	—	96 to 80	24	50	1
—	—	—	—	—	—	—	—	80 to 52	28	40	1
—	—	—	—	—	—	—	—	—	—	—	—
180 to 100	80	75	1	360 to 120	180	50	1	112 to 96	24	60	1
100 to 75	25	50	1	—	—	—	—	96 to 80	24	50	1
—	—	—	—	—	—	—	—	80 to 52	28	40	1
—	—	—	—	—	—	—	—	—	—	—	—
75 to 75	75	50	2	120 to 120	60	50	2	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
75 to 75	100	37	2	120 to 120	100	37	2	52 to 52	66·5	40	2

Cotton

12 to 14 nos. ($6\frac{1}{2}$" dia.)
Aluminium Burgancy 3-6 lbs.
45 kg. ($\frac{3}{8}$" Chain)
Manila rope $3\frac{1}{2}$" dia.
Rectangular type 175 kg.

—

Nylon

20 to 22 nos. (8" dia.)
Aluminium Burgancy 5 lbs.
70 kg. ($\frac{3}{8}$" Chain)
Combination rope 7/16" dia.
Rectangular type 175 kg.

—

1, Hemp 200×4 Cotton 20×3
16 nos. ($6\frac{1}{8}$" dia.)
Burgancy 3-5 lbs.
55 kg. ($\frac{3}{8}$" Chain)
Combination rope 9/16" dia.
Oval type 1·75 m. × 1·05 m. 178 kg.

—

TABLE - II. DATA REGARDING THE TEMPERATURE, NATURE OF BOTTOM DURING 1959 — 1963

Month	*Temperature °F*			*Nature of bottom*
January	78°	to	80°	Mud
February	70°	to	76°	Mud
March	78°	to	83°	Mud
April	81°	to	94°	Mud
May	80°	to	86°	Mud
June		82°		Mud
July	83°	to	85°	Mud
August	82°	to	86°	Mud
September	82°	to	86°	Mud
October	81.5°	to	82°	Mud
November	73°	to	76°	Mud
December	76°	to	83°	Mud

Recommendations :—

1. A systematic survey of the resources should be intensified to indicate the potentiality for industrial use in the sea, estuaries, backwaters and fresh water areas.
2. Studies in the effects of fishing and the trend of fishery in areas already fished may be undertaken.
3. There is an urgent need for a proper assessment of resources in different depth regions at different seasons and also the resources in the estuarine and brackish water. A proper method has to be evolved to assess the resources in the backwaters and estuarines.
4. Investigations on the scope of culture of prawns in inland waters which includes brackish water, will have to be taken up.
5. The survey should be intensified by the agencies concerned in places, where there is scope for organised development of prawn fisheries in relation to their utilisation and also the need for processing facilities available on shore.
6. Systematic experimental fishing should be conducted to arrive at the most effective craft and method of fishing, the optimum duration of hauls and also the proper time of fishing.
7. Resources in deeper water especially beyond 40 fathoms should be investigated for proper exploitation.
8. The results of the various items of work carried out at different parts of India by various agencies should be co-ordinated and suitably re-orienated for the benefit of the industry concerned.
9. The data on production and utilisation by the industry should be made available to the agencies charged with the responsibility of assessment of resources and effect of fishing on the stock.

TABLE III

PRAWN CATCH OF M. F. V. "JHEENGA" IN AREA 18—72

Month	1959						1960						1961					
	Gear	Effort (Hours)	Prawn catch (kg)	Total catch (kg.)	Prawn (%)	C. P. H. Prawn (kg.)	Gear	Effort (hours)	Prawn catch (kg.)	Total catch (kg.)	Prawn (%)	C.P.H. Prawn (kg.)	Gear	Effort (hours)	Prawn catch (kg.)	Total catch (kg.)	Prawn (%)	C.P.H, Prawn (kg.)
Jan.	No fishing						HT	16	144	1474	9·7	9·0	HT	63	40	19796	0·21	0·63
Feb.	S	54	145	3358	4·3	2·6	Area not fished						No prawn catch					
March	S	64	846	10052	8·4	13 2	BN	12	145	508	23	12	No prawn catch					
April	S	22	213	2570	8·0	10·0	BN	12	91	2107	4·3	7·5	,,					
May	S	40	390	4225	9·2	10·0	BN	89	124	8749	1·4	1·3	,,					
June	S	16	109	1073	10·2	6·6	BN	33	315	6985	4·5	9·5	No fishing					
July	No fishing						BN	21	163	4374	4	7·7	RT	15	15	909	1·6	1·0
August	Area not fished						HT	15	789	5280	13	52	RT	47·5	276	11959	2 6	5·8
Sept.	,,						HT	68	1763	8041	22	26	RT	78·4	459	18715	2·4	5·8
Oct.	TN	69	8448	31458	27·1	123·0	HT	31	1161	28492	4·1	37 5	RT	66·5	1576	14286	9·7	26
Nov.	TN	41	1854	23219	7·1	15·0	HT	14	447	11329	3·9	31	RT	50·7	318	10743	3·1	62
Dec.	TN	96	120	18501	1·4	1·3	HT	60	445	5309	3·8	7·4	RT	19·4	20	2664	0·75	1·0
Total	S	196	1703	21278	8·0	9·0	BN	167	838	22723	7·4	7·6	HT	63	40	19796	6·21	0·63
	TN	206	10422	73178	11·8	46·0	HT	204	4749	59925	9·4	27·1	RT	277.5	2664	59276	4·49	9·60

C.P.H. Catch per hour S.B. T.N. H.T. B.N.

R.T.

TABLE IV

PRAWN CATCH OF M. F. V. JHEENGA IN AREA 18—72

Months	1962 Gear	Effort (hours)	Prawn catch (kg.)	Total catch (kg.)	Prawns (%)	C.P.H. prawn (kg.)	1963 Gear	Effort (hours)	Prawn catch (kg.)	Total catch (kg.)	Prawns (%)	C.P.H. prawn
January ...	RT	Prawn catch nil					RT	Prawn catch nil				
February ...	RT	,,					...	Area not fished				
March ...	RT	,,					RT	19.50	3	3368	0.09	0.2
April ...	RT	,,					RT	Prawn catch nil				
May ...	RT	25.25	99	7148	1.4	3.92	RT	,, ,,				
June ...	RT	54.75	30	12253	0.2	0.5	RT	33.75	195	9556	2.0	5.8
July ...	RT	9.25	85	2081	4.1	9.2	IT	36.75	597	12574	4.7	16.2
August ...	RT	Area not fished					RT	43.43	1340	12995	10.3	30.85
September ...	RT	,,					IT	25.00	783	8528	9.2	31.3
October ...	RT	65.30	1076	32837	3.3	16.5	IT	65.00	1220	15053	8.1	18.7
November ...	RT	99.5	567	41732	1.4	5.7	IT	57.08	305	18526	1.6	5.3
December ...	RT	81.75	80	26522	0.3	0.98	IT	Prawn catch nil				
Total ...	RT	335.80	1937	122573	1.58	5.77	RT	96.68	1538	25919	5.93	15.91
							IT	183.83	2905	54681	5.31	15.80

RT IT