ON THE EXPERIMENTAL FISHING OFF ULLAL (MANGALORE)

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INTRODUCTION

Though an average of 1685 tonnes* of fish is landed annually by the mechanised boats of Mangalore, which operate during late October to early May within the 25 meter region, no information is available on the abundance, catch composition and distribution of the fishery of this area. Hence, experimental fishing was undertaken at 12 and 25 meters off Ullal and the results are presented here which may be of use for commercial exploitation of the fishery of this region. The earlier accounts on the exploratory fishing, however, relate to certain other parts of the west coast of India (Srivatsa, 1953*a*, *b*; Gopinath, 1954; Jayaraman *et al.*, 1959) except for a brief report on shrimp trawling conducted for four weeks in March/April of 1955 and 1956 between depths of 2 and 10 meters off Mangalore (Shariff, 1959).

MATERIAL AND METHODS

Trawling and gill netting, each of one hour duration, were carried out off Ullal twice a week between 7 and 10 A.M. at two stations at latitude 12° 50'N and between longitude 74° 42' and 74° 47' E in the 12 and 25 meter area (Station I and II respectively) using the departmental Pablo boat *Sea Search* (10 H.P.). The authors went on board in turn to record the observations extending from January to April in 1964 during which period 60% of the annual catch is generally landed by the mechanised vessels. The specifications of trawl and gill nets operated at the two stations are:

Trawl net	*Gill net*
Length of head rope 9½ m	Number of pieces 6
Length of foot rope 10 m	Size of each piece 20 x 2 m
Size of otter board 75 x 40 cm	Mesh 3.1 cm
Cod end mesh 3 cm	

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* Based on the figures for 1962-1965 obtained through the courtesy of the Department of Fisheries, Mysore State.

After recording the weight of the total catch separately for each gear, a random sample of the catch was taken and weighed for determining the catch composition. For the major species, details of total length, sex and maturity were recorded. Water samples for salinity estimations were collected from the surface and from the bottom using a Casella bottle. Temperature was recorded at the surface and from the bottom as soon as the Casella bottle was hauled up.

Results

During the period the total catch by both the gears amounted to 1254.86 kg, of which trawling accounted for 92.78%. The catch-per-hour of trawl was 23.76 kg and that of gill net 2.51 kg. Of the total catch, fish constituted 58.78% and the prawns the rest. The important species under the different major groups were:

Prawns:	*Metapenaeus affinis*, *M. dobsoni* and *Parapenaeopsis stylifera*.
Elasmobranchs:	*Scoliodon palasorrah*, *S. sorrakowah*, *Sphyrna zygaena* and *Rhynchobatus djiddensis*.
Sciaenids:	*Sciaena glaucus*, *Otolithus argenteus* and *O. ruber*.
Clupeids:	*Sardinella longiceps*, *S. fimbriata*, *Opisthopterus tardoore*, *Thrissocles mystax*, *T. malabaricus* and *T. setirostris*.
Carangids:	*Caranx kalla* and *C. sexfasciatus*.
Cynoglossids:	*Cynoglossus semifasciatus*.
Leiognathids:	*Leiognathus splendens*, *L. bindus*, *L. ruconius* and *L. insidiator*.
Platycephalids:	*Grammoplites scaber*.
Synodontids:	*Saurida tumbil*.
Miscellaneous:	*Lactarius lactarius*, *Therapon jarbua*, *Polynemus heptadactylus*, *Eleutheronema tetradactylum*, *Nemipterus japonicus*, *Arius jella*, *Gerres setifer*, *Parastromateus niger*, *Pampus argenteus* and *P. chinensis*.

Trawling—Comparing the total catch and catch-per-hour in the 12 and 25 meter areas where the bottom was muddy, it was noticed that they were higher in the deeper station (Table 1). On a month-wise basis, the total catch and catch-per-hour were the highest in February in the 12-meter area whereas in the 25-meter area the catch was the highest in March and the catch-per-hour in January. In both the stations prawns made up the highest catch and catch-per-hour among the different species. Among the fishes, clupeids ranked next in importance in Station I and *C. semifasciatus* in Station II. It is of interest to note that *S. tumbil* and *N. japonicus* were recorded from Station II only.

TABLE 1. *Total catch and catch/hour (in paranthesis) in kg and catch composition (trawl net).*

Groups	AT 12-METER STATION						AT 25-METER STATION					
	Jan.	Feb.	Mar.	Apr.	Total	Percentage composition	Jan.	Feb.	Mar.	Apr.	Total	Percentage composition
Prawns	69.58	123.25	67.33	28.45	288.61	53.01	90.04	43.02	77.67	17.94	228.67	36.89
	(13.92)	(17.61)	(9.62)	(4.74)	(11.54)		(18.01)	(6.15)	(12.95)	(2.99)	(9.53)	
Elasmobranchs	0.06	0.64	3.64	3.32	7.66	1.41	3.27	10.44	1.20	6.87	21.78	3.51
	(0.01)	(0.09)	(0.52)	(0.55)	(0.30)		(0.66)	(1.49)	(0.20)	(1.15)	(0.91)	
Sciaenids	4.52	24.50	18.62	16.75	64.39	11.83	8.57	6.97	14.54	17.88	47.96	7.74
	(0.90)	(3.50)	(2.66)	(2.79)	(2.58)		(1.71)	(1.00)	(2.42)	(2.98)	(2.00)	
Clupeids	4.39	19.80	19.51	26.98	70.68	12.98	0.75	21.56	15.97	12.08	50.36	8.12
	(0.88)	(2.83)	(2.79)	(4.50)	(2.83)		(0.15)	(3.08)	(2.66)	(2.01)	(2.10)	
Cynoglossids	19.03	2.82	1.97	3.54	27.36	5.03	47.46	44.53	17.83	5.90	115.72	18.67
	(3.81)	(0.40)	(0.28)	(0.59)	(1.09)		(9.49)	(6.36)	(2.97)	(0.98)	(4.82)	
Leiognathids	—	0.80	0.20	9.21	10.21	1.88	0.68	4.65	22.22	10.59	38.14	6.15
		(0.14)	(0.03)	(1.54)	(0.41)		(0.14)	(0.66)	(3.70)	(1.77)	(1.59)	
Platycephalids	1.40	1.73	0.64	1.44	5.21	0.96	4.37	7.91	7.05	0.02	19.35	3.12
	(0.28)	(0.25)	(0.09)	(0.24)	(0.21)		(0.87)	(1.13)	(1.18)	(0.003)	(0.80)	
Synodontids	—	—	—	—	—	—	0.68	10.89	4.46	—	16.03	2.59
							(0.14)	(1.56)	(0.74)		(0.67)	
Miscellaneous	4.48	17.22	17.78	30.82	70.30	12.90	11.06	19.33	18.49	32.98	81.86	13.21
	(0.90)	(2.46)	(2.54)	(5.14)	(2.81)		(2.21)	(2.76)	(3.08)	(5.50)	(3.41)	
Total	103.46	190.76	129.69	120.51	544.42		166.88	169.30	179.43	104.26	619.87	
	(20.69)	(27.25)	(18.53)	(20.09)	(21.78)		(38.38)	(24.19)	(29.91)	(17.38)	(25.83)	

Gill net—This accounted for only 7.22 % of the total landings. However, the catch-per-hour was higher in Station I (3.06 kg) than in Station II (1.91 kg) and on a month-wise basis it was highest in February at Station I (8.00 kg) and in January at Station II (3.03 kg). It was low during March and April at both the stations (0.41 to 1.81 kg). Among the different categories of fishes, clupeids were the most important forming 67.4 and 27.5% respectively in Station I and II. Carangids ranked next with 11.8 and 22.2% respectively at the two stations. As in the case of trawling, the catch of *C. semifasciatus* was higher in Station II (18.8%) as compared to Station I (3.9%).

Biological analysis—The size range, mode, sex ratio and maturity stages of the important species caught in the trawl and gill nets at the two stations are given in Table 2. Most of the species caught by each type of gear from both the stations were found to have more or less the same size range and modal length, with slight variations in the sex ratio and maturity stages. It was interesting to note that in the case of *O. tardoore* bigger size groups occurred in the deeper station and in the case of *T. mystax* specimens in advanced stages of maturity were recorded in the shallower station.

Among the species caught chiefly from Station I, *L. lactarius* and *O. ruber* had the modal size of 85-89 and 100-104 mm respectively and were either indeterminate or immature. In the case of *S. longiceps*, a species of commercial importance along the South Canara coast, the modal size (155-159 mm) was the same in the trawl and gill net catches. *S. fimbriata*, caught mainly by gill net, had a modal size of 135-139 mm and had mature gonads.

Some of the species like *A. jella, U. indicus, S. tumbil, N. japonicus, G. scaber* and *C. kalla* caught mostly from Station II were found to be generally immature except *G. scaber* wherein maturing specimens were recorded in January. Among the bigger prawns *M. monoceros* was found to be in maturing condition in February.

Catch in relation to salinity and temperature—The temperature was found to be rising from 27.20 to 31.03° C at the surface and from 26.92 to 30.90°C at the bottom during the period of study (Table 3). The bottom temperature was lower than at the surface in both the stations except in March in Station II when the surface temperature was slightly lower than that of the bottom. The salinity at the bottom was always higher than at the surface except in March and April at Station II. At Station I the catch-per-hour for both the gears was low in March and April coincident with a significant rise in temperature. However, such a relationship was not noticeable in Station II particularly for trawl in March when there was a secondary rise in the catch-per-hour. Though the catch-per-hour for both the gears at Station I appeared to have a direct relation to the variations in salinity, such a relationship was not noticeable at Station II.

TABLE 2. *Biological data on different species.*

Species	AT 12-METER STATION				AT 25-METER STATION			
	Size range (mm)	Mode (mm)	Sex ratio in % Male:Female	Maturity stages**	Size range (mm)	Mode (mm)	Sex ratio in % Male:Female	Maturity stages**
				Trawl net				
M. dobsoni	60-119	70-79	50:50	Imm.Mg.M.	70-119	75-79	72:28	Imm.Mg.M.
M. affinis	65-159	125-129	51:49	Imm.Mg.M.	90-154	125-129	54:46	Imm.Mg.M.
M. monoceros	—	—	—	—	55-169	155-159	25:75	Imm.Mg.M.
P. stylifera	45-109	75-84	52:48	Imm.Mg.M.	50-114	75-89	44:56	Imm.Mg.M.
O. ruber	80-144	100-104	60:40	I & II	—	—	—	—
S. glaucus	40-189	90-94	63:37	I to III	80-184	100-104	58:42	I
O. tardoore	55-194	95-99	43:42*	Ind. I to V	50-184	95-104 135-139	42:58	II to V
T. mystax	125-174	160-164	39:61	II to IV	125-184	165-169	50:50	I & II
S. longiceps	125-184	155-159	66:34	I & II	—	—	—	—
C. semifasciatus	75-154	125-129	34:28*	Ind. & I	90-159	125-134	30:27*	Ind. & I
L. splendens	—	—	—	—	35-114	55-64	53:47	II & III
G. scaber	—	—	—	—	55-241	165-169	57:43	I to IV
S. tumbil	—	—	—	—	75-330	290-294	28:61*	Ind. I & II
N. japonicus	—	—	—	—	70-184	85-89	53:22*	Ind. I & II
U. indicus	—	—	—	—	55-84	70-74	76:24	I
L. lactarius	55-194	85-89	13:7*	Ind. I & II	—	—	—	—
C. kalla	—	—	—	—	90-119	100-104	56:44	I
				Gill net				
O. tardoore	125-164	130-139	67:33	I to IV	125-164	130-134	64:36	II to IV
T. mystax	125-186	150-159	47:53	I to V	115-194	155-159	50:50	I to V
S. fimbriata	95-164	135-139	51:49	I to III	—	—	—	—
S. longiceps	120-199	155-159	39:61	II	—	—	—	—
C. semifasciatus	120-144	125-129	18:9*	Ind. & I	105-144	125-129	40:18*	Ind. & I
G. scaber	—	—	—	—	130-224	165-169	55:45	I to III
C. kalla	80-129	95-99	39:42*	I & II	85-139	95-99	45:55	I to III
A. jella	—	—	—	—	150-174	150-159	57:43	I

** Maturity stages for fish is according to I. C. E. S. and for prawns Imm. = immature, Mg. = Maturing and M. = Mature.
* Rest constituted by indeterminates (Ind.).

TABLE 3. *Temperature (°C) and salinity (‰) at the surface and bottom.*

	AT 12-METER STATION				AT 25-METER STATION			
	Temperature		Salinity		Temperature		Salinity	
	S	B	S	B	S	B	S	B
Jan '64	27.20	26.92	34.55	34.82	27.36	27.13	34.39	35.20
Feb '64	27.97	27.84	35.19	35.55	27.96	27.71	35.39	35.42
Mar '64	29.50	29.24	34.57	35.03	28.98	29.03	34.58	34.23
April '64	31.03	30.90	35.28	35.77	30.38	29.65	35.35	34.80

S—Surface; B—Bottom

GENERAL REMARKS

As seen from the results of the fishing operations using different gears at two stations, the catch-per-hour of trawl is always higher than that of the gill net. The overall fish production and catch-per-hour of trawl are higher in the deeper station whereas in the case of gill net these are higher in the shallow region.

In the trawl catches prawns constituted the major part whose catch-per-hour was more in the shallow station, whereas the catch-per-hour of fish as a whole was greater in the deeper station. The bigger prawns, particularly *M. monoceros* and *P. indicus* were noticed only in the deeper region. Among the fish *C. semifasciatus* was the most common in the deeper station where species of *P. indicus*, *S. tumbil*, *G. scaber* and *N. japonicus* also occurred in appreciable quantities. *O. tardoore* was the important species among clupeids caught from both the stations. *S. longiceps*, however, occurred only in Station I.

In the gill net catches, clupeids, viz., *T. mystax*, *S. fimbriata* and *S. longiceps* constituted the important group at both the stations. Of these species, *S. fimbriata* and *S. longiceps* were caught only in the shallower waters.

During the period of study the catch-per-hour of both the gears was found to be low after the peak in February in Station I and January in Station II, which seems to coincide with the rise in temperature. However, no definite relationship between catch-per-hour and salinity was apparent from the present study.

In view of the importance of this region for trawl fishery where more than a hundred mechanised boats operate, it may be pointed out that observations on similar lines in different areas are necessary for elucidating the fish potentialities in relation to the environmental factors.

SUMMARY

Experimental fishing by trawl and gill nets was conducted at two stations of 12 and 25 meters depths off Ullal (Mangalore) and the variations in the catch, catch-per-hour and catch composition have been discussed. The fluctuations in the catch-per-hour in relation to temperature and salinity have also been studied. Certain observations on the biological aspect of the important species caught have also been given.

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