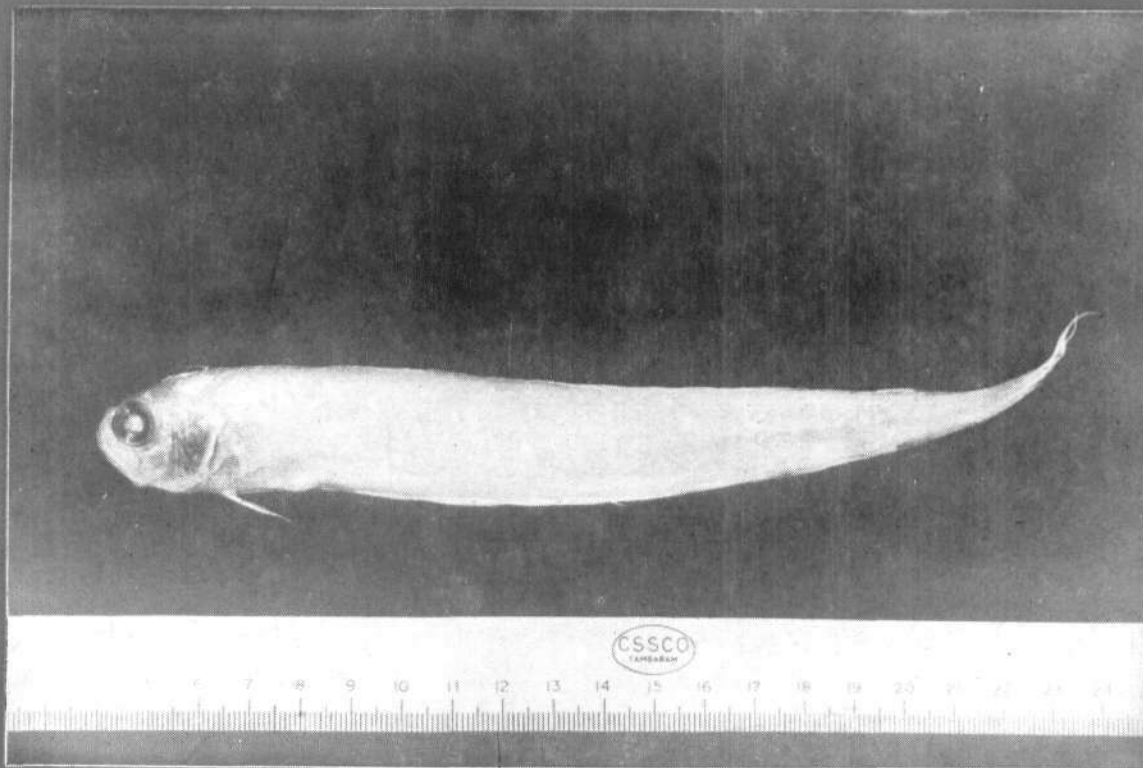




समुद्री मात्स्यिकी सूचना सेवा MARINE FISHERIES INFORMATION SERVICE

No. 99

SEPTEMBER 1989



तकनीकी एवं विस्तार अंकावली TECHNICAL AND EXTENSION SERIES

केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
कोचिन, भारत COCHIN, INDIA

भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

समुद्री मात्स्यिकी सूचना सेवा : समुद्री मात्स्यिकी पर आधारित अनुसंधान परिणामों को आयोजकों, मत्स्य उद्योगों और मत्स्य पालकों के बीच प्रसार करना और तकनीकी का प्रयोगशाला से श्रमशाला तक हस्तांतरित करना इस तकनीकी और विस्तार अंकावली का लक्ष्य है।

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Abbreviation – *Mar. Fish. Infor. Serv., T & E Ser.*, No. 99: 1989

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The deep water fish *Acanthocephala* sp. which was caught in large quantities at Panayurkuppam, Madras in shallow waters in August-September, 1987.

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A view of the Madras Fisheries Harbour.

पृष्ठ आवरण चित्र: मद्रास के मत्स्यिकी बन्दरगाह का एक दृश्य ।

THE PRESENT STATUS OF SMALL SCALE TRADITIONAL FISHERY AT TUTICORIN

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Introduction

Tuticorin enjoys an unique position along the Gulf of Mannar in the east coast of India in view of the facilities available for the development and exploitation of the marine fisheries of the region. A good fishing harbour affords facilities for smaller trawlers in the mechanised fishing sector. Large industrial fishery trawlers get facilities in the major harbour. Even with the increasing emphasis on mechanised industrial fishing, the traditional fisheries flourished at Tuticorin and play a great role in the economic well being of the coastal population in the sense, that regular fishing with multiplicity of gears is conducted all round the year. Good marketing and curing facilities add great importance for expansion of the indigenous fishery. Traditional fisheries contribute between 4,500 and 7,450 tonnes (average 6,351 tonnes) of fish every year to the economy of Tuticorin. Production statistics show that the inshore waters, where the traditional fishermen fish, are highly productive. Several varieties of fish like sardines, perches, anchovies, seer fish and tuna are abundant in the inshore waters of Tuticorin. There is a well established traditional system of craft and gears suited for the local conditions.



Fig. 1. Tuticorin type boats at Tuticorin North fish landing centre.

Over the last several years significant developments have taken place in the fisheries of the region by the introduction of advanced gears for fishing in inshore waters. Many commercial establishments engaged in fish trade are interested in the qualitative and quantitative seasonal changes in the fisheries. This account is a positive attempt to highlight the changing pattern of the traditional fishery over the last few years and gives a comprehensive coverage of the gear-wise, species-wise and season-wise fish landings by the small scale traditional sector from 1979 to 1985 based on regular sampling of the commercial catch at Tuticorin fish landing centres.

Annual production

There have been ups and downs in the annual trend of fisheries (Table 1). Total annual catch varied from 4,512.0 tonnes in 1982 to 7,457.4 tonnes in 1980. Steadily high estimated landings were recorded during the 1983-'85 period. Average annual catch for the period 1979-'85 came to 6,351.2 tonnes. Annual catch dipped below the average catch only in three years; in 1979, 1981 and 1982. The sardine gill net was the most important gear in the traditional fishery and contributed well over 70% of the annual average fish catch

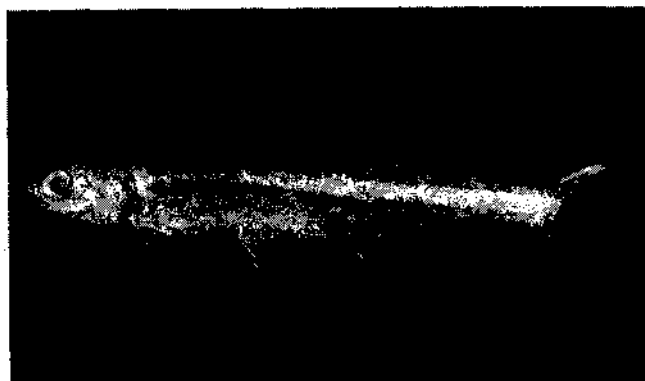


Fig. 2. *Stolephorus indicus*.

Table 1. Gear-wise effort, catch (tonne) and catch per unit effort (kg) annual average catch (tonne) for the period 1979-85

Gears	Effort, catch & C/E	1979	1980	1981	1982	1983	1984	1985	Annual average (tonne)	Total
Chala valai	E	59,012	52,018	50,163	48,905	57,954	49,703	50,636	52,627	3,68,391
	C	4,70.70	4,712.2	4,004.1	3,252.7	5,104.4	4,755.4	5,230.0	4,538.0	31,765.8
	C/E	79.8	90.6	79.8	66.5	88.1	95.7	103.3	86.3	603.8
Paru valai	E	1,679	3,874	3,964	4,049	3,057	3,395	2,541	3,223	22,559
	C	146.8	629.0	594.7	425.9	322.7	385.5	289.6	399.2	2,794.2
	C/E	87.4	162.4	150.0	105.2	105.6	113.5	114.0	119.7	838.1
Podi valai	E	1,772	1,791	531	1,119	1,080	1,395	3,700	1,627	11,388
	C	111.9	103.3	23.3	31.7	41.06	62.0	294.3	95.4	668.1
	C/E	63.2	57.7	43.9	28.3	38.5	44.4	79.5	50.8	355.5
Hand line	E	2,301	3,811	4,409	3,730	5,275	43,34	5,163	4,146	29,023
	C	299.7	325.9	297.5	240.6	378.2	253.9	365.7	308.8	2,161.5
	C/E	130.2	85.5	67.5	64.5	71.7	58.6	70.8	78.4	548.8
Long line	E	3,502	4,682	1,414	2,341	3,790	6,655	8,209	4,270	30,593
	C	383.3	650.4	133.0	165.5	309.5	634.6	693.6	424.3	2,969.9
	C/E	109.4	138.9	94.0	70.7	81.7	95.4	84.5	96.4	674.6
Troll line	E	2,516	3,230	1,729	2,908	2,465	1,904	1,412	2,309	16,164
	C	364.5	315.5	177.4	202.5	144.5	135.4	147.3	212.3	1,487.1
	C/E	144.9	97.7	102.6	69.6	58.6	71.1	104.3	92.7	648.8
Sinki valai	E	972	1,536	856	1,458	819	1,059	1,427	1,161	8,127
	C	48.6	154.5	105.9	115.1	88.6	103.4	120.4	105.2	736.5
	C/E	50.0	100.6	123.8	78.9	108.1	97.7	84.4	91.9	643.5
Thirukkai valai	E	773	3,235	925	705	2,380	2,166	2,422	1,800	12,606
	C	168.8	457.1	126.3	74.1	290.6	173.7	247.8	219.8	1,538.4
	C/E	218.4	141.3	136.6	105.0	122.1	80.2	102.3	129.4	905.9
Shore seine	E	31	65	20	53	121	00	66	51	356
	C	5.4	6.3	0.9	3.2	11.9	00	7.5	5.0	35.2
	C/E	173.2	97.4	43.9	61.3	98.2	00	113.8	84.0	587.8
Thallu madi	E	2,979	2,885	356	52	628	4,069	695	1,666	11,664
	C	28.4	99.5	7.5	0.7	20.6	98.7	42.6	42.6	298.0
	C/E	9.5	34.5	21.0	13.5	32.7	24.3	61.3	28.1	196.8
Other gears (Explosives)	E		28		00	00	00	00	4	28
	C		3.7		00	00	00	00	0.5	3.7
	C/E		131.0		00	00	00	00	18.7	131.0
Annual total catch (tonne)		6,464.4	7,457.4	5,470.6	4,512.0	6,712.6	6,602.6	7,438.8	6,351.2	44,458.4

Note: E = Effort, C = Total catch in tonne, C/E = Catch per unit, Effort in kg.

by all the gears combined together. Next important was the long line (hook & line) locally called *Ayiramkal thoondil*. On an average 52,627 sardine gill net units were operated every year. Catch per unit

was higher for the drift net of larger mesh size called *Thirukkai valai* because of the greater weight of the skates and rays caught in this net. Table 1 gives the relative efficiency of each type of gear in the form of

catch per unit. The fishery by detonation of explosive charge was less common at Tuticorin and was practiced in 1980 only.

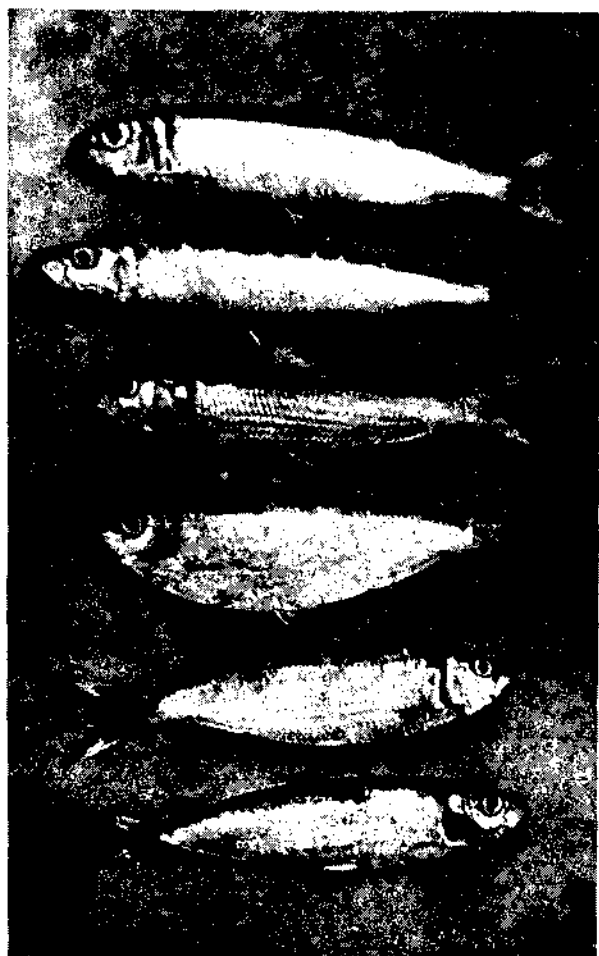


Fig. 3. Sardines at Tuticorin: from bottom *Sardinella gibbosa*, *S. dayi*, *S. albella*, *S. longiceps*, *S. sirm*, *S. clupeioides*.

Craft and gear

The all weather craft employed and popularised by the local fishermen is the plank built boat called Tuticorin type boat locally named *Vallam*. These are designed primarily for sailing and used for all type of traditional fishery. Recently mechanisation has enhanced their efficiency. Few catamaran from Kanyakumari also are stationed regularly at Tuticorin and are mostly engaged in line fishing. Regular census was taken every year for the study of the number of crafts employed in the traditional fishery at Tuticorin and the data are as follows:

Year	Tuticorin type boat	Catamaran	Total
1979	357	27	384
1980	421	29	450
1981	484	19	503
1982	490	14	504
1983	482	29	519
1984	492	7	49
1985	510	14	524

Gill nets, drift nets and hooks & line with many variations among them are the principal gears in the traditional fishery. With improvements in material and technology, now-a-days the gill nets and drift nets are made of synthetic fibres, and entire pieces made by machines. Detailed account of the craft and gear employed by the traditional fishery at Tuticorin is given by Freda and Ubaldraj (*Madras J. Fish.*, 4: 77-87, 1971). Eleven types of fishing gears were operated during the course of this study with varying degrees of contribution to the fishery. Their details are given below:

Name of gear	Details (mesh size etc.)
Drift net (<i>Paru valai</i>)	No. 7: 14.0 cm No. 8: 16.0 cm No. 9: 17.5 cm No. 10: 18.5 cm
Drift net (<i>Podi valai</i>)	No. 2: 5.5 cm No. 3: 6.0 cm No. 4: 7.0 cm
Sardine gill net (<i>Chala valai</i>)	2.5 to 3.0 cm
Hand line (<i>Thoondil</i>)	Hook No. 5 to 14
Long line (<i>Aytramkal thoondil</i>)	Hook No. 5 and 6
Troll line (<i>Odukayiru</i>)	Hook No. 1 and 2
Bottom set net (<i>Thirukkai valai</i>)	
Bottom set net (<i>Sinki valai</i>)	
Shore seine (<i>Karai valai</i>)	
Prawn net (<i>Thallu madi</i>)	
Explosives	

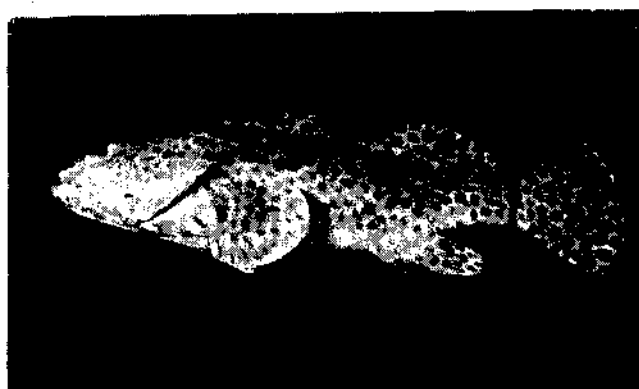


Fig. 4. *Epinephelus malabaricus*.

Table 2. Catch composition of important groups of fish (tonnes) during the year 1979–1985 in Chala valai

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
<i>Sardinella albella</i>	217.8	919.0	650.3	347.1	318.9	478.4	539.6	3,471.1	495.9	10.9	3
<i>Sardinella dayi</i>	931.2	623.9	433.5	219.5	207.9	321.8	359.7	3,097.5	442.5	9.8	4
<i>Sardinella gibbosa</i>	1,526.5	1,713.3	1,233.1	1,488.3	2,647.0	2,105.7	2,334.2	13,048.1	1,864.0	41.1	1
<i>Sardinella sirm</i>	894.3	500.6	1,342.0	821.2	1,502.1	971.3	962.6	6,994.1	999.2	22.0	2
<i>Sardinella clupeoides</i>	12.8	11.7	00	61.1	90.8	13.3	105.2	294.9	42.1	6.9	11
<i>Sardinella longiceps</i>	200.9	529.3	31.9	41.6	16.3	59.6	230.5	1,110.1	158.6	3.5	5
<i>Thriissoles</i>	326.6	123.7	93.1	82.4	61.5	203.8	201.2	1,092.3	156.0	3.4	6
<i>Letognathus</i>	256.7	113.7	90.4	67.2	40.0	229.0	187.0	984.0	140.6	3.1	7
Carangids	85.5	31.3	12.0	12.9	17.0	50.6	97.4	306.7	43.8	1.0	10
<i>Sphyræna</i>	65.3	65.6	41.4	32.4	23.2	74.0	75.2	377.1	53.9	1.2	8
<i>Therapon</i>	62.6	00	10.8	10.1	17.0	22.3	25.4	148.2	21.2	0.5	14
Seer fish	3.8	00	5.7	9.8	12.2	20.3	7.5	59.3	8.5	0.2	15
<i>Chirocentrus</i>	56.0	35.9	15.4	21.3	78.3	113.0	48.7	368.6	52.7	1.2	9
<i>Sillago</i>	9.7	5.7	24.5	13.4	46.0	46.8	29.9	176.0	25.1	0.6	13
Miscellaneous	57.3	38.5	20.0	24.4	26.2	45.5	25.9	237.8	34.0	0.7	12
Total	4,707.0	4,712.2	4,004.1	3,252.7	5,104.4	4,755.4	5,230.0	31,765.8	4,538.0		

Table 3. Catch composition of important groups of fish (tonnes) during the years 1979–1985 in Paru valai (drift net)

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	4.8	44.7	48.0	42.8	46.6	18.8	25.7	231.4	33.1	8.3	5
Skates	00	00	3.4	2.3	00	2.0	00	7.7	1.1	0.3	20
Rays	1.2	6.4	5.6	18.3	8.1	9.4	00	49.0	7.0	1.2	14
Tuna	11.5	76.2	60.9	32.3	40.8	68.2	17.4	307.3	43.9	11.0	2
Seer fish	48.8	231.00	173.1	157.6	64.5	51.3	24.0	750.3	107.2	26.9	1
Carangids	8.7	40.9	53.6	42.4	33.2	52.1	29.0	259.9	37.0	9.3	3
<i>Chorinemus</i>	7.5	16.4	17.3	12.1	5.3	8.5	1.6	68.7	9.8	2.5	10
Cat fish	9.8	45.6	47.3	22.4	12.6	15.2	11.3	164.2	23.5	5.9	7
Lethrinids	13.2	41.0	53.6	20.9	27.6	39.2	55.6	251.1	35.9	9.0	4
<i>Serranus</i>	13.6	10.6	22.9	20.2	36.5	48.6	40.7	193.1	27.6	6.9	6
<i>Lutjanus</i>	1.8	12.0	23.2	9.4	4.0	24.8	35.0	110.2	15.7	3.9	9
<i>Diagramma</i>	2.4	8.9	8.5	5.1	8.6	4.0	3.6	41.1	5.9	1.5	12
<i>Sphyræna</i>	11.2	50.5	28.8	16.8	13.4	18.0	26.9	165.6	23.7	5.9	8
<i>Istiophorus</i>	00	2.3	10.8	3.4	4.0	00	4.6	25.1	3.6	0.9	17
<i>Rachycentron</i>	4.8	15.0	5.0	8.8	4.8	7.0	7.0	52.4	7.5	1.9	11
<i>Lates culcarifer</i>	2.7	7.8	10.0	3.2	2.0	4.8	4.9	35.4	5.0	1.3	13
<i>Polynemus</i>	2.2	7.7	9.9	1.7	2.2	2.3	1.7	27.7	4.0	1.0	16
<i>Elops saurus</i>	00	2.3	7.4	00	00	0.8	00	10.5	1.5	0.4	19
Other perch like fishes	1.8	5.7	2.0	5.6	6.9	8.2	00	30.2	4.3	1.1	15
Miscellaneous	0.8	4.0	3.4	0.6	1.6	2.3	0.6	13.3	1.9	0.5	18
Total	146.8	629.0	594.7	425.9	322.7	385.5	289.6	2,794.2	399.2		

Gear-wise landings

1. Sardine gill net ('Chala valai')

This gear was operated during all the years and contributed to the maximum catch in all the months. Average annual landings came to 4,538 tonnes which was 71.5% of the total fish landings by indigenous gears. Only during 1981 and 1982 the total catch went below the average catch. Catch per unit for the gear came to 86.3 kg. High catch per unit was reported from October to December indicating good fishery during that period. Exceptionally high catch per unit was also noticed during September of 1983 and August, 1985.



Fig. 5. *Serranus* sp.

Lesser sardine as a group dominated the catch of sardine gill nets. Other species like *Thrissocles*, *Sphyraena*, *Leiognathus*, *Chirocentrus*, carangids and many smaller species of fish were recorded in the sardine gill net catch. *Sardinella gibbosa* was the dominant species forming 41.1% in the catch by the gear.

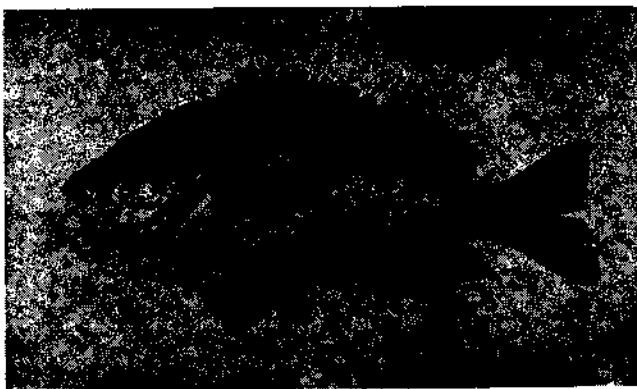


Fig. 6. *Lutjanus rivulatus*

2. Drift net ('Paru valai')

Another important gear for fishing larger fish was the *paru valai* which was operated during all the months. Larger fish especially seer fish, tuna, carangids, perches, *Chorinemus* and barracuda were the main components caught by this net. Seer fish formed 26.9% in the average catch by *paru valai* followed by tuna 11.0% and carangids 9.3%. Annual total catch by this gear came to 399.2 tonnes with the catch per gear rate at 119.7 kg. Largest catch per unit of 162.4 kg was recorded in 1980. Catch per unit trends give no definite period of good fishery for this gear. However, good fish landings by *paru valai* were made during January to April.

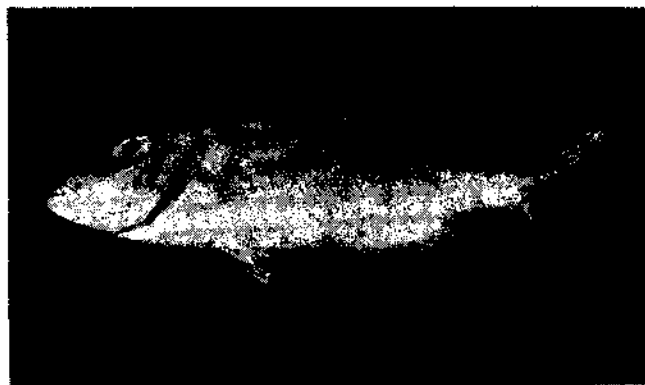


Fig. 7. *Lethrinus nebulosus*.

3. Drift net ('Podi valai')

This is a smaller meshed net operated during all the months to catch medium sized pelagic and demersal species of fish. Annual fish landings by *podu valai* fluctuated from 23.3 tonnes in 1981 to 294.3 tonnes in 1985 with the average catch at 95.4 tonnes. Annual catch per unit also fluctuated from 28.3 kg in 1982 to 79.5 kg in 1985 with the average at 50.8 kg. Medium sized tuna formed 18.4% of the average catch followed by seer fish (16.1%) and *Chirocentrus* (12.4%). Other fishes forming the catch included *Hilsa* *toll*, perches, carangids and barracuda. There are no uniformly high or low catch by this gear in any of the months and many months recorded good catch per unit rates.

4. Hand line ('Thoondil')

During the period an average of 4,146 hand line units were operated annually, landing 308.8 of fish. The catch per unit was at 78.4 kg. Total fish catch by this gear in a year ranged from 240.6 to 378.8 tonnes. Catch per unit was lowest in 1984 with 58.6 kg and high catch per unit was recorded in 1979

with 130.2 kg of fish. *Nemipterus* formed the dominant group of fish caught with 35.9%. Next important group of fish were lethrinids (20.4%) and *Belone* (10.3%). Carangids, serranids, other perches and balistids were the other important groups of fishes caught by hand lines. Though operated during all the months the period from January to March reported good catch per unit by hand lines.



Fig. 8. *Caranx melampygus*.

5. Long line ('Ayiramkal thoondil')

Tuticorin is famous for a fishery by this gear. On an average 4,370 long line units were operated in a year recording fish catch of 424.3 tonnes. The catch per unit came to 96.4 kg. This gear was operated almost all the months. There was wide fluctuation in the catch by long line units with lowest catch of 133.0 tonnes in 1981 and highest catch of 693.6 tonnes in 1985. Catch per unit was highest in 1980 with 138.9 kg and the month of February recorded high catch per unit of 531.7 kg of fish. Larger perches, sharks and rays, carangids, seer fish and cat fish formed the bulk of the long line catch. *Lethrinus* formed 29.4% of the landings followed by *Serranus* (21.7%) and sharks (15.6%). The months of January, February, August and September recorded good landings by long line units.

6. Troll line ('Odukayiru')

During all the years the troll line was operated at Tuticorin with the number of units ranged from 1,412 in 1985 to 3,230 in 1980. On an average in an year 2,309 units were operated landing 212.4 tonnes of fish. The catch per unit came to 92.7 kg. Highest fish landing by troll line was reported during 1979 with 364.5 tonnes. The catch per unit was 144.9 kg of fish per unit. October 1981 reported a catch per unit of 964.4 kg of fish. Mainly seer fish (57.9%), *Rachycentron* (11.6%) and tuna (10.2%) were

caught by troll line. The months from October to January reported good catch per unit by troll line operations.

7. Lobster net ('Sinki valai')

Operated near coral and shingle bottom areas for lobsters and crabs, this bottom set gill net also catches good quantity of other fishes. On the average 1,161 *sinki valai* units were operated per year and the total catch came to 105.2 tonnes. Average catch per unit came to 91.9 kg which is a fairly high quantity. Total catch varied between 48.6 tonnes in 1979 and 154.5 tonnes in 1980. High catch per unit of 123.8 kg was reported in 1981. Lobster and crabs formed only a low percentage of the catch. Major portion of the *sinki valai* landings was formed by perches, rays, cat fish, carangids and parrot fish. Lethrinids formed 18.7% of the catch, rays (16.8%) and *Diagramma* (16.4%). Lobsters contributed 1.8% of the catch. The months August to October recorded good catch per unit by this gear.

8. Bottom set net ('Thirukkai valai')

Mostly set at the bottom and with large mesh size these nets are operated for bottom dwelling larger fishes. These are operated during particular periods when fishermen feel that they could get good catch especially during the months from May to October. An average of 1,800 *thirukkai valai* units were operated per year landing 219.8 tonnes of fish with the catch per unit of 129.4 kg. Good landings of 457.1 tonnes of fish were reported in 1980 by this gear. Highest catch per unit was in 1979 with 218.4 kg and the lowest was in 1984 at 80.2 kg. Varieties of large sharks, rays and skates were main groups of fishes caught by *thirukkai valai*. Rays formed 69.9%, sharks 15.2% and skates 14.7% of

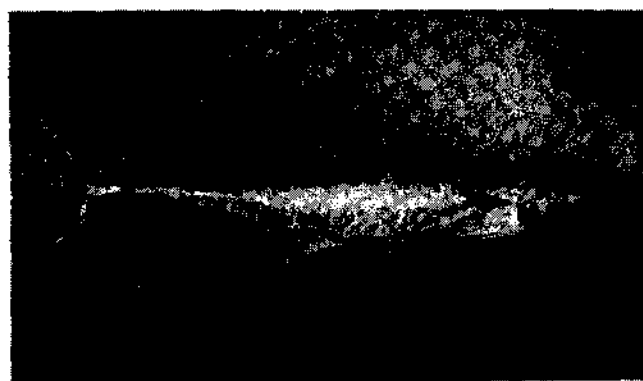


Fig. 9. *Scomberomorus commerson*.

the catch. Though good catch was reported on different months, May, June, August and September gave better catch per unit by this gear.

9. Shore seine ('Kara valai')

Normally shore seines are not operated at Tuticorin. Shore seine landings from nearby villages are brought to Tuticorin for disposal. Except for 1984, shore seine landings were recorded during all the years. On an average 51 shore seine units were reported with total catch of 5.0 tonnes. Miscellaneous groups of small fish formed the main component in shore seine landings forming 33.2%. Among others *Belone* and *Hemirhamphus* (19.6%), sciaenids (13.4%) and leiognathids (13.1%) formed the catch.

10. Prawn net ('Thallu madi')

This is a specialised gear used to catch prawns. But many varieties of smaller fish are also caught in this gear. In recent years this gear has become popular among the traditional fishermen and on an average 1,666 units per year were operated landing 42.6 tonnes of fish. Good landing of 99.5 tonnes were reported in 1980 with the catch per unit at 34.5 kg. High catch per unit was obtained during 1985 with 61.3 kg. Leiognathids formed the main group of fish caught by this net followed by prawns and sciaenids. Leiognathids formed 43.7% of the catch, prawns 13.5% and sciaenids 10.4%. Other species caught by this net included *Hilsa toli*, crabs and miscellaneous groups. There was no definite season for the operation of this net. However, good catch per unit was reported from February to April.

11. Explosive charges

Some fish were caught by using explosives in 1980. A weak charge of explosives was detonated near coral islands and the fish collected when they came up to the surface immobilized. Clandestinely, it was reported that the system was used several times during the past years and the fish caught were sold along with other fishes. Carangids and perches were usually caught by this method.

Species composition

The traditional fisheries of Tuticorin coast include a large variety of fishes, prawns, lobsters and crabs. The dominant fishery by indigenous crafts and gears is pelagic contributed by lesser sardines, carangids, seer fish and anchovies. Contribution to demersal fisheries is made by sharks and rays, perches and perch-like fishes.

Prawns, lobsters and crabs though, form a small percentage by weight in the marine fisheries are the source of lucrative commerce. Percentage composition of important groups of fishes caught by different gears are given in Table 13. Average month-wise landings of important groups of fishes caught by the traditional fishermen are given in Table 13.

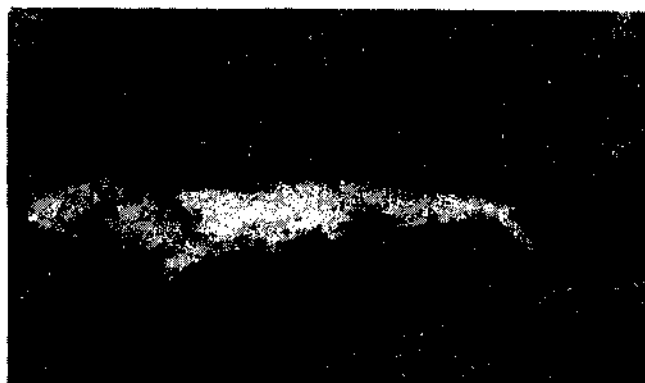


Fig. 10. *Eulamia melanoptera*

Lesser sardines *Sardinella* spp. rank foremost among all the groups of fishes caught by traditional gears. On an average 3,843.7 tonnes of lesser sardines are landed every year forming 60.5% of the annual fish landings. *Sardinella gibbosa* is the important species of lesser sardine caught at Tuticorin followed by *S. Sirm*, *S. albella*, *S. dayi* and *S. clupeioides*. Gill nets with mesh size 2.5 to 3.0 cm are used to catch lesser sardines. They are caught during all the months of the year. However, the months September to December recorded increased landings of lesser sardines.

Perches are the important group in the demersal fisheries at Tuticorin caught by traditional fishermen. Mostly contributed by species of *Lethrinus*, *Serranus*, *Lutjanus* and *Diagramma* they form the large and medium sized fishes caught by drift nets and hooks & line. Perches together form 8.2% in the total landings and contribute over 521.1 tonnes of fish annually. Of the perches *Lethrinus nebulosus*, *L. rhodopterus*, *Lutjanus ulviflamma*, *L. rivulatus*, and *Pristipomoides typus* are the important species. Large sized perches popularly called 'Kalava' and 'Koduva' (*Serranus* spp. and *Lates calcarifer*) occur regularly in the Tuticorin fishery. Perches are available throughout the year.

Sharks, rays and skates contribute a total of 147.4, 191.4 and 33.3 tonnes respectively and together form 5.9% in the total landings. Large sharks and rays are caught by *paru valai*, *thirukkai valai* and long line units.

Most of the skates are caught by *thirukkai valai* only. They are caught throughout the year and the quantity varies with the number of units operated during a parti-

cular month. However, June to September are good months for sharks, rays and skates. Fins of sharks and skates are valued in the export trade.

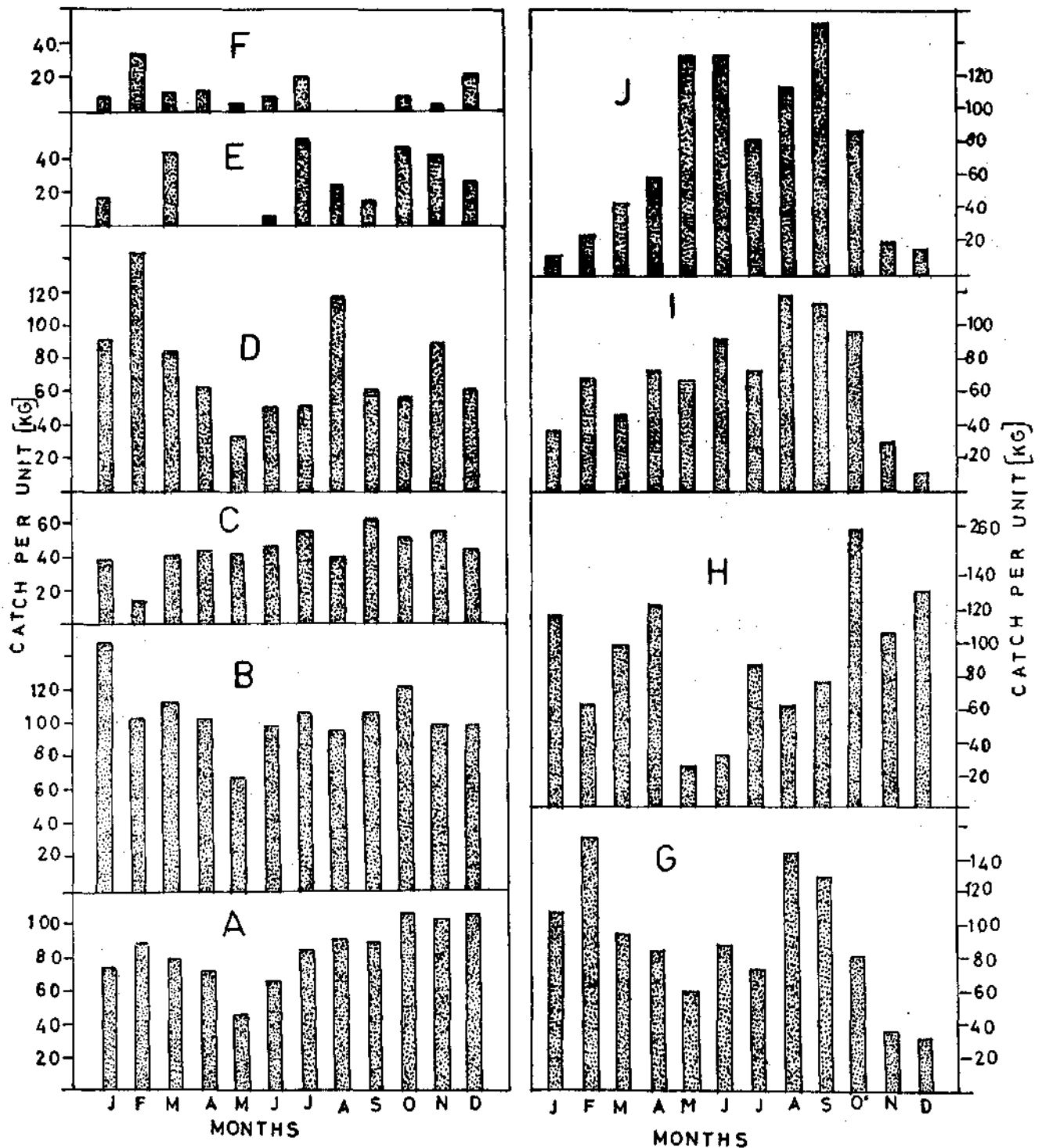


Fig. 11. Seasonal trends in the catch per unit effort by important fishing gears at Tuticorin during 1979-1985: A. Chala valai, B. Paru valai, C. Podi valai, D. Hand line, E. Shore seine, F. Thallu madi, G. Long line, H. Troll line, I. Sinki valai, J. Thirukkai valai.

The seer fish *Scomberomorus* spp. are the important quality fish caught at Tuticorin. On an average 266.5 tonnes of seer fish are caught by traditional fishermen. Most of the seer fish are caught by troll line and drift net (*paru valai*). *Scomberomorus guttatus*, *S. commerson* and *S. lineolatus* are the important species in the commercial catch. Total quantity of seer fish landed in an year form 4.2% of the average fish catch. The months from November to January recorded good landings of seer fish.

Carangids are represented by many species in the commercial catches and form 3.0% of the total landings. Small, medium and large specimens of carangids occur in the fishery. In an year an average of 186.0 tonnes of carangids landed by traditional fishing gear and are caught by gill nets, drift nets and hook & lines. Large carangids are caught by drift nets and hook & lines. Highest landings of carangids are reported in July.

Silver bellies (*Leiognathidae*) form an important group caught by sardine gill nets and the prawn net *thallu madl*. On the average 159.9 tonnes of silver bellies are caught every year forming 2.5% in the total catch. They are caught during all the months along with other fishes with increased landings from January to April.

Anchovies form a good portion of fish caught by sardine gill nets. At times they form the major component in the sardine gill net catch. *Thriptocles* spp. and *Ilsha* spp. form the major groups among anchovies in the fishery. They contribute 156.4 tonnes annually forming 2.5% in the total catch. Anchovies alongwith leiognathids are much sought after by the industry for reduction into fish meal. January to March are the good months for anchovies at Tuticorin and landings at slightly reduced quantity are recorded till May.

Nemipterus amounts to 110.8 tonnes in the hand line catch and forms 1.7% in the average annual landings. Entire *Nemipterus* catch is by hand lines caught along with other fishes. *Nemipterus bleekeri* is the important species in the fishery. Good landings are reported in November.

The oil sardine *Sardinella longiceps* forms a small fishery at Tuticorin in the traditional sector. Along with lesser sardines and anchovies oil sardines are caught in sardine gill nets. Average annual oil sardine catch comes to 158.6 tonnes. Unlike lesser sardines the oil sardines are not caught every month nor do they occur

every year in good quantity. Not much importance is given to the fishery of oil sardine by the traditional fishermen as it is not relished locally. Almost all the oil sardine caught are marketed at outstation markets especially Kerala.

Sphyraena commonly called barracuda forms a regular fishery at Tuticorin. On the average 100 tonnes of barracuda are landed annually. Smaller sized fish are caught by *podl valai*. Larger barracuda specimens occasionally occur in small numbers in drift nets of different mesh sizes and by troll line. October to December recorded increased landings.

Cat fishes form an important component in the *paru valai* and long line catches. Large cat fishes occur in good numbers in the *paru valai* fishery. On an average 23.5 tonnes of cat fish are landed annually forming 5.9% of the *paru valai* catch. About 14.5 tonnes of cat fishes are landed by long line contributing to 3.4% of the long line catch. Good quantity of cat fish forming 8.8% of its landings are caught in *sinkt valai*. Annual landings of cat fish by *sinkt valai* came to 9.3 tonnes. March and April are the good months for cat fish catch at Tuticorin.

Tuna and bill fishes are caught regularly by traditional gears. These two fishes occur during the same months. Tunas, mostly *Euthynnus affinis*, are caught in *paru valai*, *podl valai* and troll line. Bill fishes occur in *paru valai* catch. In a year 83.2 tonnes of tunas and 3.6 tonnes of bill fishes are caught by the small scale fishermen. They occur in good numbers during June to September at Tuticorin.

Chirocentrus and *Hilsa tili* among the clupeids are important forms contributing to 64.5 and 15.1 tonnes respectively to the total fish catch. *Chirocentrus* is mainly caught by *vala valai* (mesh size 5.5 to 6.0 cm) and *podl valai*. *Hilsa tili* occurs in the landings of *podl valai* and *thallu madl*. Good numbers of *Chirocentrus* are recorded during August to December and the months of March and April are good for *Hilsa tili* fishery.

Other fishes form a sizable portion in the total catch by the traditional fishermen. There are many species of fishes contributing less than 50 tonnes annually to the total landings. Details about the monthly landings are given in Table 13. Special mention may be made about the fishery of *Chorinemus* spp., *Rachycentron* spp. and belonids. They are considered as important food fishes and are caught in good numbers during certain months.

Table 4. *Catch composition of important groups of fishes (tonnes) during the years 1979–1985 in Podi valai (drift net)*

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	00	6.6	1.2	0.3	1.4	00	6.5	16.0	2.3	2.4	11
Tuna	2.5	9.9	2.2	2.3	7.8	19.2	79.2	123.1	17.6	18.4	1
Seer fish	14.0	23.0	4.1	5.3	8.2	10.9	42.2	107.7	15.4	16.1	2
Carangids	5.7	2.5	1.6	2.1	3.3	6.0	29.9	51.1	7.3	7.6	6
<i>Chorlinemus</i>	0.4	0.2	0.3	00	0.3	0.9	4.0	6.1	0.9	0.9	14
Mackerel	18.3	5.6	00	0.1	1.9	0.7	4.1	30.7	4.4	4.6	8
Cat fish	0.4	1.2	00	0.3	00	1.9	6.4	10.2	1.5	1.5	13
Lethrinids	1.2	1.0	1.0	1.4	3.5	4.4	41.9	54.4	7.8	8.1	5
<i>Serranus</i>	1.6	00	00	1.1	0.3	0.9	15.3	19.2	2.7	2.9	10
Lutjanids	00	00	00	00	00	00	5.2	5.2	0.7	0.8	15
<i>Sphyræna</i>	6.2	2.7	1.1	3.3	3.0	3.0	23.1	42.4	6.0	6.3	7
<i>Hilsa tili</i>	21.6	33.6	5.9	3.6	3.0	3.3	4.3	75.3	10.8	11.3	4
<i>Chirocentrus</i>	37.4	10.6	3.8	5.5	6.6	7.7	11.2	82.8	11.8	12.4	3
Sciaenids	0.2	2.1	0.1	00	0.4	0.6	1.2	4.6	0.7	0.7	16
Other perch-like fishes	0.5	2.4	1.2	6.1	0.6	0.5	17.5	28.8	4.0	4.3	9
Miscellaneous	1.9	1.9	0.8	0.3	1.3	2.0	2.3	10.5	1.5	1.6	12
Total	111.9	103.3	23.3	31.7	41.6	62.0	294.3	668.1	95.4		

Table 5. *Catch composition of important groups of fish (tonnes) during the year 1979–1985 in Hand (Thoondli line)*

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	21.6	10.3	0.4	00	00	00	00	32.3	4.6	1.5	10
Lethrinids	67.5	100.7	64.4	17.5	56.4	59.2	76.2	441.9	63.0	20.4	2
<i>Serranus</i>	20.2	40.9	26.0	10.5	59.9	17.5	34.5	209.5	29.9	9.7	4
Lutjanids	8.0	10.2	22.5	4.8	9.1	2.7	14.1	71.4	10.2	3.3	8
<i>Diagramma</i>	18.9	20.3	3.5	1.3	6.8	00	00	50.8	7.3	2.4	9
Carangids	12.3	33.9	37.5	20.6	11.7	11.9	9.7	137.6	19.7	6.4	5
Cat fish	14.4	9.5	0.6	1.2	00	00	00	25.7	3.7	1.2	11
<i>Nemipterus</i>	59.2	73.8	107.4	144.3	182.0	85.0	123.7	775.4	110.8	35.9	1
Balistids	15.7	4.1	0.8	0.3	3.0	39.4	11.8	75.1	10.7	3.5	7
<i>Belone</i>	12.6	15.9	13.2	28.9	36.5	32.2	83.4	222.7	31.8	10.3	3
Other perch-like fishes	46.4	5.5	17.1	4.2	11.0	4.6	7.5	96.3	13.8	4.5	6
Miscellaneous	2.9	0.8	4.1	7.0	1.8	1.4	4.8	22.8	3.3	1.1	12
Total	229.7	325.9	297.5	240.6	378.2	253.9	365.7	2,161.5	308.8		

Table 6. *Catch composition of important groups of fish (tonnes) during 1979–1985 in (Ayiramkal thoondil) Long line*

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	129.2	83.9	2.4	14.0	88.4	65.2	80.6	463.7	66.2	15.6	3
Rays	20.3	52.2	7.9	1.9	6.9	1.7	00	90.9	13.0	3.1	7
Seer fish	0.1	17.2	9.4	0.9	8.8	17.1	16.9	70.4	10.1	2.4	8
Cat fish	00	8.7	6.2	8.5	22.2	41.4	14.5	101.5	14.5	3.4	6
Carangids	39.7	91.4	19.8	34.2	56.7	65.1	41.0	347.9	49.7	11.7	4
<i>Chorinemus</i>	7.4	14.7	00	4.6	7.5	6.6	2.4	43.2	6.2	1.5	9
<i>Lethrinus</i>	111.2	247.9	39.8	21.7	52.0	186.0	214.9	873.4	124.8	29.4	1
<i>Serranus</i>	66.2	83.3	18.6	58.7	44.4	180.7	193.9	645.8	92.3	21.7	2
Lutjanids	8.4	20.9	26.5	5.5	6.0	50.1	111.0	228.4	32.6	7.7	5
<i>Diagramma</i>	00	5.4	0.6	1.1	9.4	8.2	6.5	31.2	4.5	1.1	10
<i>Lates calcarifer</i>	00	1.0	00	1.2	00	8.2	5.7	16.1	2.3	0.5	13
<i>Polynemus</i>	00	13.6	0.9	0.9	1.7	00	00	17.1	2.4	0.6	11
<i>Sphyaena</i>	00	1.5	0.6	00	00	00	00	2.1	0.3	0.1	16
<i>Elops saurus</i>	00	0.8	00	5.5	00	00	00	6.3	0.9	0.2	15
Other perchlike fishes	00	3.4	00	6.2	1.3	3.9	00	14.8	2.1	0.5	14
Miscellaneous	0.8	4.5	0.3	0.6	4.2	0.4	6.3	17.1	2.4	0.6	12
Total	383.3	650.4	133.0	165.5	309.5	634.6	693.6	2,969.9	424.3		

Table 7. *Catch composition of important groups of fish (tonnes) during the year 1979–1985 in (Odu kayiru) Troll line*

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	00	2.6	49.6	1.6	00	00	00	53.8	7.7	3.6	6
Tuna	28.4	47.3	5.4	15.2	7.5	17.2	30.8	151.8	21.7	10.2	3
Seer fish	154.7	181.4	91.8	156.6	108.4	81.2	86.3	860.4	122.9	57.9	1
Carangids	99.5	27.3	2.3	00	00	1.6	00	130.7	18.6	8.8	4
<i>Sphyaena</i>	15.0	34.0	20.4	13.3	15.7	6.4	8.4	113.2	16.2	7.6	5
<i>Rachycentron</i>	66.9	20.7	4.8	15.8	12.9	29.0	21.8	171.9	24.5	11.6	2
Miscellaneous	00	2.2	3.1	00	00	00	00	5.3	0.8	0.4	7
Total	364.5	315.5	177.4	202.5	144.5	135.4	147.3	1,487.1	212.4		

Table 8. *Catch composition of important groups of fish (tonnes) during the year 1979–1985 in Sinki valai (Bottom set net)*

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Rays	4.3	7.2	16.3	58.4	7.2	12.7	18.0	124.1	17.7	16.8	2
Seer fish	0.2	4.0	2.7	3.6	2.3	1.7	2.0	16.5	2.4	2.2	11
Carangids	4.0	10.8	8.3	11.0	7.0	2.4	9.9	53.4	7.6	7.3	6
Cat fish	1.7	7.7	7.3	9.4	9.9	11.7	17.4	65.1	9.3	8.8	5
Lethrinids	11.6	57.5	17.0	6.7	12.7	8.7	23.7	137.9	19.7	18.7	1
Serranus	1.7	4.9	15.8	4.2	21.6	29.8	14.5	92.5	13.2	12.6	4
Lutjanids	2.3	1.4	6.8	2.4	1.7	3.8	0.5	18.9	2.7	2.6	10
Diagramma	10.2	30.0	15.6	10.7	16.7	25.4	11.9	120.5	17.2	16.4	3
Rachycentron	1.7	2.0	0.6	1.0	0.2	00	00	5.5	0.8	0.7	14
Callyodon	6.0	9.8	1.9	1.5	1.8	1.3	4.3	26.6	3.8	3.6	7
Soles	00	7.3	1.3	1.4	3.4	2.9	8.3	24.6	3.5	3.3	9
Lobster	1.8	1.8	1.5	0.6	1.6	1.5	4.4	13.2	1.9	1.8	12
Crabs	2.2	00	00	00	00	00	0.5	2.7	0.4	0.4	15
Other fish	0.9	8.5	8.7	3.3	1.5	1.5	0.5	24.9	3.6	3.4	8
Miscellaneous	00	1.6	2.1	0.9	1.0	00	4.5	10.1	1.4	1.4	13
Total	48.6	154.5	105.9	115.1	88.6	103.4	120.4	736.5	105.2		

Table 9. *Catch composition of important groups of fish (tonnes) during 1979–1985 in Thirukkai valai (Bottom set net)*

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	18.8	55.3	18.1	4.5	57.8	26.3	53.7	234.6	33.5	15.2	2
Rays	147.8	321.6	94.7	62.4	172.2	125.7	151.7	1,076.1	153.7	69.9	1
Skates	00	80.2	13.5	7.2	60.6	21.7	42.3	225.5	32.2	14.7	3
Miscellaneous	2.2	00	00	00	00	00	00	2.2	0.3	0.1	4
Total	168.8	457.1	126.3	74.1	290.6	173.6	247.8	1,538.4	219.8		

Table 10. *Catch composition of important groups of fish (tonnes) during 1979–1985 in Kara valai (shore seine)*

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Carangids	00	00	0.2	00	2.0	00	00	2.2	0.3	6.3	6
Belonids	0.6	2.4	0.4	1.8	1.7	00	00	6.9	1.0	19.6	2
Leiognathids	0.5	00	00	00	2.2	00	1.9	4.6	0.7	13.1	4
Sciaenids	1.0	0.2	00	00	0.8	00	2.7	4.7	0.7	13.4	3
Thriissocles	00	00	00	00	2.6	00	0.5	3.1	0.4	8.8	5
Stolephorus	00	0.1	00	00	0.8	00	00	0.9	0.1	2.6	7
Prawns	00	0.1	00	00	00	00	0.1	0.2	0.2	0.6	9
Crabs	0.2	0.1	00	00	0.6	00	00	0.9	0.1	2.6	8
Miscellaneous	3.1	3.4	0.3	1.4	1.2	00	2.3	11.7	1.7	33.2	1
Total	5.4	6.3	0.9	3.2	11.9	00	7.5	35.2	5.0		

Table 11. Catch composition of important groups of fish (tonnes) during the year 1979–1985 in Thallu madi (Prawn net)

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
<i>Leiognathus</i>	17.2	58.0	3.3	00	11.0	17.7	23.1	130.3	18.6	43.7	1
Sciaenids	00	3.6	00	00	2.0	18.3	7.2	31.1	4.4	10.4	3
Carangids	00	00	00	00	00	11.5	00	11.5	1.6	3.9	7
<i>Hilsa toli</i>	00	6.7	00	00	00	23.2	00	29.9	4.3	10.0	4
<i>Stolephorus</i>	00	00	00	00	00	00	4.9	4.9	0.7	1.6	8
Prawns	10.8	11.3	1.4	0.2	2.6	9.8	4.1	40.2	5.7	13.5	2
Crabs	00	13.7	0.6	0.1	00	14.2	00	28.6	4.2	9.6	5
Miscellaneous	0.4	6.2	2.2	0.4	5.0	4.0	3.3	21.5	3.1	7.0	6
Total	28.4	99.5	7.5	0.7	20.6	98.7	42.6	298.0	42.6		

Table 12. Percentage contribution by different gears to the landings of important groups of fish based on average annual landings during the period 1979–1985

Fish groups	Chala valai	Paru valai	Podi valai	Hand line	Long line	Troll line	Sinki valai	Thiru- kkai valai	Shore seine	Thallu madi	Other gears	Annual average catch (tonne)
Sharks	—	22.5	1.6	3.1	44.9	5.2	—	22.7	—	—	—	147.4
Rays	—	3.7	—	—	6.8	—	9.2	80.3	—	—	—	191.4
Skates	—	3.3	—	—	—	—	—	96.7	—	—	—	33.3
Lesser sardine	100	—	—	—	—	—	—	—	—	—	—	3,843.7
Oil sardine	100	—	—	—	—	—	—	—	—	—	—	158.6
<i>Stolephorus</i>	—	—	—	—	—	—	—	—	12.5	87.5	—	0.8
<i>Elops saurus</i>	—	62.5	—	—	37.5	—	—	—	—	—	—	2.4
<i>Hilsa toli</i>	—	—	71.5	—	—	—	—	—	—	28.5	—	15.1
<i>Chirocentrus</i>	81.7	—	18.3	—	—	—	—	—	—	—	—	64.5
<i>Thriposocles</i>	99.7	—	—	—	—	—	—	—	0.3	—	—	156.4
Cat fish	—	44.8	2.9	7.0	27.6	—	17.7	—	—	—	—	52.5
<i>Sphyraena</i>	53.8	23.7	6.0	—	0.3	16.2	—	—	—	—	—	100.1
Carangids	23.5	19.9	3.8	10.6	26.7	10.0	4.1	—	0.2	0.9	0.2	186.0
<i>Chorinemus</i>	—	58.0	5.3	—	36.7	—	—	—	—	—	—	16.9
<i>Lutjanus</i>	—	25.4	1.0	16.5	52.7	—	4.4	—	—	—	—	61.9
<i>Nemipterus</i>	—	—	—	100.0	—	—	—	—	—	—	—	110.8
Leiognathids	88.0	—	—	—	—	—	—	—	0.4	11.6	—	159.9
Sciaenids	—	—	12.0	—	—	—	—	—	12.1	75.9	—	5.8
Mackerel	—	—	100.0	—	—	—	—	—	—	—	—	4.4
Tuna	—	52.8	21.2	—	—	26.0	—	—	—	—	—	83.2
Lethrinids	—	14.3	3.1	25.1	49.7	—	7.8	—	—	—	—	251.2
<i>Serranus</i>	—	16.7	1.6	18.0	55.7	—	8.0	—	—	—	—	165.7
<i>Diagramma</i>	—	16.9	—	20.9	12.9	—	49.0	—	—	—	0.3	35.0
<i>Lates calcarifer</i>	—	68.5	—	—	31.5	—	—	—	—	—	—	7.3
<i>Polynemus</i>	—	62.5	—	—	37.5	—	—	—	—	—	—	6.4
Seer fish	3.2	40.2	5.8	—	3.8	46.1	0.9	—	—	—	—	266.0
<i>Istiophorus</i>	—	100	—	—	—	—	—	—	—	—	—	3.6

Table 12. (Contd.)

Fish groups	Chala valai	Paru valai	Podi valai	Hand line	Long line	Troll line	Sinki valai	Thiru- kkai valai	Shore seine	Thallu madi	Other gears	Annual average catch (tonne)
<i>Rachycentron</i>	—	22.9	—	—	—	74.7	2.4	—	—	—	—	32.8
Belonids	—	—	—	97.0	—	—	—	—	3.0	—	—	32.8
<i>Culiyodon</i>	—	—	—	—	—	—	100.0	—	—	—	—	3.8
Soles	—	—	—	—	—	—	100.0	—	—	—	—	3.5
Balistids	—	—	—	100.0	—	—	—	—	—	—	—	10.7
<i>Therapon</i>	100.0	—	—	—	—	—	—	—	—	—	—	21.2
<i>Sillago sihama</i>	100.0	—	—	—	—	—	—	—	—	—	—	25.1
Lobster	—	—	—	—	—	—	100.0	—	—	—	—	1.9
Prawns	—	—	—	—	—	—	—	—	0.3	99.7	—	5.7
Crabs	—	—	—	—	—	—	8.5	—	2.1	89.4	—	4.7
Other perch-like fishes	—	15.5	14.4	49.6	7.6	—	12.9	—	—	—	—	27.8
Miscellaneous	67.5	3.8	3.0	6.5	4.8	1.6	2.2	0.6	3.4	6.2	—	50.4
Total (tonnes)	4,538.0	399.2	95.4	308.8	424.3	212.4	105.2	219.8	5.0	42.6	0.5	6,351
%	71.5	6.3	1.5	4.8	6.7	3.3	1.6	3.4	0.1	0.7	0.1	

Prawns, lobsters and crabs are considered important in the export oriented trade. On an average 5.7 tonnes of prawns are landed every year by the traditional sector. The prawn net called *thallu madi* is exclusively used in the traditional sector to catch prawns. The months of March and December are considered good for the prawn fishery. Lobsters constitute a good fishery at Tuticorin. They are never abundant in the terms of major fin fishes like sardines but are much valued in the export trade. Per year 1.9 tonnes of lobsters land at Tuticorin exclusively caught by the lobster net *sinki valai*. August and October are the good months for the lobster fishery. Edible crabs form 4.7 tonnes in the commercial fishery by indigenous gears. They are mostly caught by *thallu madi* along with prawns and other fishes. Small quantity of crabs are caught by *sinki valai* also. Major portion of the crab catch comes during the months of January and July.

Remarks

The study has provided a detailed knowledge of the vicissitudes experienced by the traditional small scale fishery at Tuticorin. Year by year analysis of fish production indicates that the fishery by traditional sector is very much stable and improving. The average fish production in this sector is not only fairly high, but also the recent trends show a greater level of yield over and

above the average annual catch. So much so, there is indication that fish production by the traditional sector could be increased by adopting improved fishing techniques. Some improvements in craft and gear have taken place recently and their impact in the fishery are yet to be studied.

For exploiting the near shore pelagic resources the sardine gill net, drift nets and hook & lines are very effective. The traditional fishermen have successfully tapped these resources using different gears. Highly esteemed demersal resources like *Kalava* (*Serranus* spp.), *Koduva* (*Lates* sp.), *Velameen* (*Lethrinus* spp.) and *Kooral* (*Pseudosciaena* spp.) have been fished by long lines and drift nets. Contribution by the demersal fisheries to the total landings is fairly considerable. Bottom set nets are effectively used to fish large quantities of rays and skates.

At present export oriented fisheries like prawns and lobsters are controlled by mechanised trawlers. On a smaller scale they are fished by traditional fishermen using modified indigenous gears. Great strides have been made in this direction. There are indications that the traditional fishery at Tuticorin is poised for greater growth in the near future and the catch is likely to increase.

Table 13. Average month-wise landings of important marine fishes at Tuticorin (in kg) from 1979 to 1985

Name of fish	January	Feb.	March	April	May	June	July	August	September	October	November	December	Total
Sharks	10,015.6	19,027.7	13,939.9	14,370.6	8,510.0	11,492.0	14,060.7	15,187.9	19,733.10	11,130.3	4,040.4	5,891.9	1,47,400
Rays	8,413.7	5,349.3	9,575.7	14,742.6	19,551.9	42,388.7	19,113.1	22,658.0	29,130.7	16,890.0	2,336.0	1,250.3	1,91,400
Skates	232.1	68.4	850.1	960.6	3,605.7	7,508.9	11,217.9	5,209.7	2,168.9	1,104.0	346.7	27.0	333.00
Lesser sardine	2,72,644.3	3,04,648.9	3,38,213.6	2,66,522.0	1,66,418.9	1,99,566.1	3,38,996.4	3,53,778.9	3,67,593.6	4,24,457.6	3,67,537.7	4,43,322.1	38,43,700
Oil sardine	4,057.9	694.3	5,712.7	3,468.0	3,214.8	00	00	13,865.9	25,159.7	30459.4	52,158.7	19,808.7	1,58,600
<i>Stolephorus</i>	00	00	115.7	00	00	17.1	11.4	00	00	00	00	655.7	800
<i>Elops saurus</i>	492.9	141.9	115.7	35.7	00	541.0	150.0	493.7	2500.0	107.1	00	72.0	2,4000
<i>Hilsa toll</i>	721.6	154.3	3,506.1	2,043.7	717.1	665.6	402.6	288.6	745.3	2,489.4	2,420.3	945.4	15,100
<i>Chirocentrus</i>	822.0	244.0	357.0	939.9	430.6	3,587.3	1,435.0	8,691.6	8,838.3	9,674.6	10,543.0	18,936.7	64,050
<i>Thriassocles</i>	40,166.6	29,832.1	30,505.3	18,887.4	24,848.0	7,442.4	2,566.7	00	1,826.9	77.2	00	247.4	1,56,400
Cat fish	4,523.9	4,915.7	7,940.4	7,976.4	5,279.9	4,286.9	1,096.2	2,702.9	2,928.0	4,852.4	3,299.6	2,697.7	52,500
<i>Sphyræna</i>	9,163.1	6,193.3	8,349.3	13,880.0	2,909.6	4,499.7	5,188.7	4,318.1	6,412.3	14,099.9	10,927.3	14,328.7	1,00,180
Carangids	14,144.6	16,932.4	17,085.0	12,933.6	15,422.6	15,223.7	21,167.6	15,878.1	16,167.9	16,257.1	7,533.4	17,234.0	1,86,000
<i>Chorinemus</i>	2,510.9	725.4	1,070.1	1,730.0	3,325.6	2,536.6	464.1	525.1	497.0	2,230.6	404.6	852.0	16,872
<i>Lutjanus</i>	4,835.4	6,489.7	9,548.9	9,249.0	2,247.9	3,592.0	1,952.6	4,278.3	11,001.6	4,348.9	1,900.7	2,455.0	61,900
<i>Nemipterus</i>	13,073.0	5,454.4	13,253.0	6,283.7	6,784.6	2,036.6	12,029.9	5,386.4	9,352.0	10,052.7	16,492.0	10,601.7	1,10,800
Leiognathids	25,135.7	26,040.0	23,594.5	20,601.9	10,922.7	7,581.0	14,010.0	14,387.0	4,006.7	4,440.3	1,674.0	7,505.3	1,59,899
Sciaenids	29.7	272.6	2,343.0	773.9	70.6	100.3	233.4	93.7	78.6	452.9	315.7	1,035.6	5,800
Mackerel	51.7	00	786.6	707.9	149.9	181.9	295.7	83.0	12.7	367.4	1,536.1	227.1	4,400
Tuna	6,239.7	697.1	1,988.0	4,280.0	3,851.9	14,161.00	10,039.1	9,246.4	12,292.7	7,387.9	4,918.9	8,126.3	83,229
Lethrinids	32,200.4	25,172.4	24,508.3	17,925.0	19,339.4	21,946.1	12,952.6	23,423.0	30,523.3	18,497.3	14,850.2	9,904.0	2,51,242
<i>Serranus</i>	13,307.1	11,734.4	19,338.1	13,357.1	14,023.6	12,074.1	10,798.4	14,727.3	23,970.4	19,712.6	7,452.0	5,203.9	1,65,699
<i>Diagramma</i>	3,660.0	2,484.0	1,399.0	1,503.7	2,142.7	4,484.7	3,020.9	6,437.1	4,957.1	2,835.3	929.6	1,054.9	34,909
<i>Lates calcarifer</i>	1,024.6	638.3	745.0	287.6	891.7	713.0	154.3	705.7	156.7	576.7	875.4	531.0	7,300
<i>Polynemus</i>	312.6	147.3	583.6	1,075.7	632.3	87.9	54.7	40.9	105.7	1,893.3	745.0	721.0	6,400
Seer fish	36,747.7	12,916.7	13,840.4	28,190.9	7,040.7	8,476.4	15,211.7	27,553.4	21,610.6	23,546.1	42,943.4	28,421.0	2,66,499
<i>Istiophorus</i>	00	85.7	00	272.3	00	321.4	1,004.9	1,403.7	59.4	88.0	185.7	178.9	3,600
<i>Rachycentron</i>	2,571.4	1,745.4	7,066.1	4,374.3	2,424.3	791.3	685.9	1,488.7	2,932.3	4,774.0	2,625.6	1,320.7	32,800
Belonids	4,099.1	906.6	2,280.0	860.9	460.3	1,293.4	1,857.4	877.3	1,115.0	2,151.4	8,515.3	8,383.3	32,800
Lobster	22.1	72.0	101.3	312.9	126.9	191.1	202.4	233.7	132.0	294.9	210.7	00	1,900
Prawns	167.1	334.3	1,268.6	452.9	179.0	161.4	321.6	00	00	1,013.1	544.7	1,277.3	5,720
Crabs	1,435.7	85.7	00	00	00	00	1,062.9	49.7	292.9	801.7	900.0	21.4	4,700
Other fishes	8,528.6	16,060.4	10,140.0	11,482.00	5,396.6	11,212.3	9,677.3	8,308.0	20,904.7	10,267.7	11,620.9	19,101.5	1,42,500
TOTAL	5,21,400.8	5,00,264.7	5,70,120.9	4,80,482.2	3,30,939.8	3,89,161.9	5,11,436.1	5,62,321.8	6,24,756.0	6,47,241.8	5,80,783.6	6,32,339.4	63,51,249

AN UNUSUAL CONGREGATION OF ORGANISMS IN THE CATCHES OFF KOVALAM, MADRAS*

Introduction

The fishermen belonging to Kovalam (Lat. 12° 47' N, Long. 80° 25' E), a small village situated 40 km south of Madras, had a hectic activity in harvesting huge quantities of fish from the Kovalam bay from 26-8-'87 to 4-9-'87. Fishermen employed all available gears for catching the fish and prawns. While fishing, many rock-dwelling marine organisms such as crinoids, asteroids and gorgonians also got entangled in the nets. Though fishing activity was maximum off Kovalam, fishermen from villages north and south of Kovalam also reported unusually heavy landings of fish in the same period. According to them, this was due to the appearance of 'Vandal thanneer' or turbid water close to the shore. The present account embodies the results of the observations made on this unusual phenomenon.

Observations

Fishing: On the first day (26-8-'87), a few units of boat-seine (*Thuri-valai*), trammel net (*Manivalai*) and gill-net (*Pannu valai* and *Ara valai*) were operated from catamarans in the bay, where the depth ranged from 4 to 5 m, while the drag nets (*Konda valai*) were employed in the surf-beaten shore area. Encouraged by heavy catches, more units were put into operation repeatedly. The time taken for hauling each unit ranged from 1 to 2 hours. The sea was calm and turbid during the entire period of observation.

Catch: Date-wise estimated landings of fish and prawns at Kovalam during 26th August to 14th September, 1987 are given in Table 1. The catch was mainly constituted by coral fishes, silver bellies, ribbon fishes, soles, rays, eels and prawns (Fig. 1). At Panayurkuppam, which is 10 km north of Kovalam, heavy landings of fishes were recorded on 3-9-'87, mainly constituted by a deep water fish, *Acanthocephala* sp. (front cover photo) (1,014 kg), followed by soles (358 kg). The total estimated catch on that day was 1,742 kg. Similarly, unusual fishery comprising mainly of coral fishes, soles, rays and silver bellies were also reported from other villages bordering Kovalam bay.

Species composition: Fishes, prawns and crabs which were caught in the indigenous gears are listed below:

Fishes

1. Deep water: *Acanthocephala* sp., *Hoplobrotula gnathopus*, *Lepidaplois hirsutus*, *Trichiurus auriga*, *Holocentrus rubrum*, *H. sammara*.



Fig. 1. A boat-seine catch of demersal fishes, comprising mainly soles, ribbon fishes and silverbellies.

2. Coral reefs and rock-dwelling: *Abudefduf saxatilis*, *Alectis indica*, *Apogon fleurieu*, *A. quadrisclatus*, *A. monochrous*, *A. bandanensis*, *Apogonichthys ellioti*, *A. quacketti*, *Apistus* sp., *Coryphaesopla cornuta*, *Chaetodon vagabunda*, *Centropyge bispinosus*, *Chelonodon patoca*, *Cheilodipterus lineatus*, *Citharoides macrolepis*, *Canthigaster marginatus*, *Diploprion bifasciatus*, *Gastrophysus scleratus*, *Lagocephalus inermis*, *Muraena tessellata*, *Ostracion tuberculatus*, *Pomacanthodes semicirculatus*, *P. imperator*, *Pempheris mola*, *Scorpaena natalensis*, *Siderea thyrsoides*, *Triacanthus blaculeatus*, *Trygon* sp.

3. Demersal: *Chiloscyllium griseum*, *Drepane punctata*, *Dasyatis jenkinsii*, *D. imbricatus*, *Gazza minuta*, *Glossogobius* sp., *Heteromycteris oculus*, *Leiognathus splendens*, *L. lineolatus*, *Lutjanus fulviflamma*, *L. argenteimaculatus*, *Lethrinus fraenatus*, *Myripristis murdjan*, *Narcine timlei*, *N. brunnea*, *Narke dipterygia*, *Nemipterus mesoprion*, *Pseudorhombus triocellatus*, *Plotosus anguillaris*, *Psettodes erumei*, *Platycephalus asper*, *Parupeneus indicus*, *P. barberinus*, *P. trifasciatus*, *Siganus canaliculatus*.

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tus, *Secutor insidiator*, *Stolephrous bataviensis*, *S. heterolobus*, *Sillago sihama*, *Scomberomorus commersoni*, *Sphyræna jello*, *Trypauchen vagina*, *Upeneus vittatus*, *U. sulphureus*, *Zebrias quagga*.

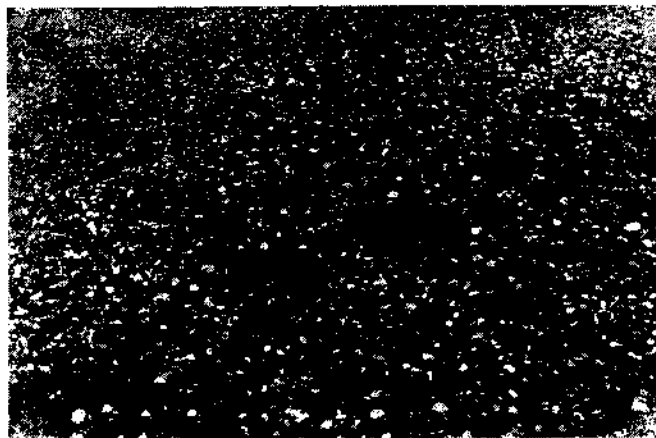


Fig. 2. A view of the intertidal area of the Kovalam beach strewn with living and dead molluscan shells.

Prawns

1. Penaeid prawns

Shallow water: *Metapenaeus dobsoni*, *M. monoceros*, *Penaeus indicus*, *P. monodon*, *P. semisulcatus*, *Parapenaeopsis maxillipedo*, *P. cornuta*, *P. stylifera*, *P. nana*, *Solenocera crassicornis*.

Deep water: *Parapenaeus longipes*, *Trachypenaeus* sp.

2. Non-penaeid prawns: *Acetes indicus*, *Exopalaemon styliferus*, *Exhippolysmata ensirostris*, *Nematopalaemon tenuipes*.

Crabs

1. Shallow water: *Charybdis annulata*, *C. (C.) feriata*, *Doclea hybrida*, *Matutabankii* sp., *Portunus pelagicus*, *P. sanguinolentus*.

2. Deep water: *Charybdis (C.) Vertegate*.

3. Coral-dwelling: *Atergatis ufloridus*, *A. integerimus*, *Schizophrys aspera*.

Among the penaeid prawns caught at Kovalam by boat seines, *Parapenaeopsis stylifera* (size range: 66–126 mm in total length; modal length: 101–110 mm for females and 81–90 mm for males) was dominant, followed by *P. maxillipedo* (58–110 mm in TL), *Metapenaeus*

monoceros (75–127 mm in TL), *M. dobsoni* (76–110 mm in TL) and *Trachypenaeus* sp. (71–91 mm in TL).

Apart from fishes, crustaceans and echinoderms from the shallow waters and huge quantities of molluscan shells were also washed ashore and their names are given below (Fig. 2).

Babylonia sp., *Barbitta* sp., *Cardium* sp., *Crassostrea* sp., *Cyprea* sp., *Clinocardium* sp., *Chama* sp., *Donax* sp., *Modiolus* sp., *Murex trapa*, *M. virfens*, *Oliva* sp., *Pecten* sp., *Prestrea* sp., *Pitar* sp., *Pteria* sp., *Saccostrea* sp., *Semele* sp., *Thais* sp., *Tellina* sp., *Turritella* sp., *Trichomya* sp., *Vesticardium flavum*.

Hydrographical parameters: Results of analysis of water samples collected during the course of study are given in Table 2. A steep fall in surface water temperature (26.0°C) was observed on the 4th day of observation. The surface temperature, seven days prior to the event was 28.0°C. Further, it lowered to 24.5°C on the seventh day (1–9-'87). Thereafter, it gradually increased to 27.0°C, which is four days after the event.

The values of dissolved oxygen was 2.37 ml/l on the fourth day and thereafter it varied from 2.38 to 3.22 ml/l. The comparatively higher values recorded during the present study may probably be due to the sampling in the surf-beaten area.

Remarks

From the local enquiries, it was learnt that appearance of turbid water ('Vandal thanneer') in Kovalam bay is an annual phenomenon particularly during August–September months. However, its conspicuous impact on the fishery of the area was observed only in certain years. In 1982, Vivekanandan *et al.*, reported a similar but widespread phenomenon along the north Tamilnadu coast and opined that this might be the result of upwelling-like phenomenon. The gradual drop in atmospheric and surface sea water temperature, fall in dissolved oxygen of the surface waters and high turbidity, all characteristics of coastal upwelling were recorded during the present observation. Besides, unusually large quantities of demersal fishes such as soles, rays and eels, coral-dwelling and deep water fishes and prawns, some of which not normally caught from the shallow areas of the Kovalam bay, were caught during this period. The exceptional congregation of coral-dwelling and deep water organisms would have been due to their movement into the shallow areas of the bay along with the movement of the oxygen deficient

Table 1. Estimated total landings of fish at Kovalam

Date	Estimated total landings in kg	Dominant items
26-8-'87	500	Silver bellies, ribbon fishes, prawns
27-8-'87	600	"
28-8-'87	850	"
29-8-'87	1,200	Coral fishes, soles, rays, prawns, eels and silver bellies
30-8-'87	450	"
31-8-'87	700	"
1-9-'87	2,300	"
2-9-'87	1,050	"
3-9-'87	150	"
4-9-'87	50	"

subsurface waters towards the coast. The most significant among the observations was the appearance of a deep water fish *Acanthocephala* sp. in the bay. The landing of more than 1,000 kg of this deep water fish at Panayurkuppam, 10 km north of Kovalam further substantiates the suggestion of shoreward movement of the deep water. Moreover, crinoids, gorgonians and molluscs which inhabit the rocky areas would have been washed away from their natural habitat by the strong shoreward currents associated with the upwelling-like phenomenon.

Table 2. Hydrographical features of the surface waters of Kovalam bay from 18-8-'87 to 10-9-'87

Date	Temperature (°C)		Salinity (‰)	Dissolved oxygen (ml/l)
	Atmospheric	Surface water		
18-8-'87	33.8	28.0	—	4.37
29-8-'87	30.5	26.0	—	2.37
30-8-'87	30.2	26.0	35.97	2.61
31-8-'87	29.9	26.0	"	2.38
1-9-'87	29.8	24.5	"	2.38
2-9-'87	29.6	25.6	"	—
3-9-'87	30.4	25.8	35.60	3.22
4-9-'87	31.2	27.0	36.10	3.03
8-9-'87	33.7	27.0	"	4.01
10-9-'87	34.1	30.8	36.92	—

Though there are several reports on coastal upwelling along the Indian coast, majority of them are from the west coast of India and only few were related with the fish catch. The present observation of unusual assembling of coral-dwelling and deep water fishes and prawns near the coast shows that shoreward movement of deep water occurs along the North Tamilnadu coast during August-September period. Further study of the hydrographical features and fishery during this period is required to substantiate the actual cause of such phenomena.



टूटिकोरिन के परंपरागत लघु मत्स्य उद्योगों की वर्तमान स्थिति*

प्रस्तावना

समुद्री मात्स्यिकी के विकास एवं समुपयोजन की सुविधा की दृष्टि में भारत के पूर्वी तट पर टूटिकोरिन की स्थिति बेजोड़ है। यंत्रीकृत सेक्टर के छोटे टूलरों के लिए यहाँ के मत्स्य बन्दरगाह सुविधा देती है और बड़े औद्योगिक मत्स्य टूलरों को प्रधान बन्दरगाहों से सुविधायें मिलती हैं। यद्यपि टूटिकोरिन में यंत्रीकृत औद्योगिक मात्स्यिकी का विकास हुआ तथापि परंपरागत मात्स्यिकी का ह्रास नहीं हुआ बल्कि वह साथ ही साथ समृद्ध होकर तटवर्ती लोगों के आर्थिक स्थिति सुधारने में काफी सहायक भी हो चुका है। अच्छा मार्केटिंग और संसाधन सुविधा

देशज मात्स्यिकी के विकास के लिए अधिक महत्वपूर्ण सिद्ध हुआ। परंपरागत मत्स्यन से टूटिकोरिन में 4,500 से 7,450 टन (औसत 6,351 टन) के मत्स्य हर साल में प्राप्त होते हैं। उत्पादन आँकड़ों के अनुसार अपतट जल, जहाँ परंपरागत मत्स्यन चलता है अधिक उपजाऊ दीख पड़ती है। टूटिकोरिन के अपतट जलों में तारली, पेरु, ऐंचोकी, सुरमई, ट्यूना आदि मछलियों की प्रचुरता है। स्थानीय काफ़्ट और गिअरों के लिए अनुयोज्य एक सुस्थापित परंपरागत प्रणाली है। उन्नतिशील गिअरों की प्रस्तुति से इस क्षेत्र का मत्स्यन कार्यक्रम में काफी प्रगति हुई है। मत्स्यन कार्य में लीन कई वाणिज्य संस्थाएँ मात्स्यिकी में होनेवाले गुणात्मक और मात्रात्मक ऋतुकालिक परिवर्तनों में तत्पर हैं। टूटिकोरिन की मात्स्यिकी में 1979 से 1985 तक की अवधि में हुई प्रगति का मुख्यांश नीचे प्रस्तुत की है।

* पी. सॉम बनेट और जी अरुमुखम केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान कोचिन द्वारा तैयारित

वार्षिक उत्पादन

मात्स्यिकी के वार्षिक-उपनति में उतार चढ़ाव स्वाभाविक है। सन् 1982 में कुल वार्षिक पकड़ 4,512.0 टन था तो 1980 में 7,457.4 टन था। सन् 1983-85 वर्षों में स्थलन उच्च था। 1979-1985 तक के समय की औसत पकड़ 6,351.2 टन था। 1979, 81 व 82 वर्षों में वार्षिक पकड़ औसत पकड़ से नीचे आ गयी। परंपरागत मात्स्यिकी में सारङ्गाइन गिल नेट का मुख्य स्थान था और वार्षिक औसत पकड़ का 70 % इस नेट से प्राप्त हुआ था। अगला मुख्य संभार था लंबी डोर जिसका स्थानीय नाम है “आयिरम्काल तूण्डल”। प्रत्येक साल में औसत 52,627 सारङ्गाइन नेट एककों का प्रचालन होते थे। बड़े आलाक्षियों वाला बिफ्ट आलों का प्रति एकक पकड़ उच्च था।

फाफ्ट और गीअर

टूटिकोरिन में “बल्लम” नाम से पुकारे जाने वाले प्लवक-निर्मित पोत धीवरों द्वारा सभी मौसम में उपयोग किये जाते हैं। आजकल यंत्रिकरण से इसकी दक्षता और बढ़ायी गयी है। इसके अलावा कन्याकुमारी से कुछ कटामरैन नियमित रूप से टूटिकोरिन में आकर मत्स्यन कार्य करते हैं।

परंपरागत मत्स्यन के प्रधान गिअर हैं गिल जाल, बिफ्ट जाल और कौटा-डोर। आजकल गिल जाल और बिफ्ट जालों का निर्माण सिन्थेटिक फाइबर द्वारा यंत्रों से किया जाता है।

विविध गिअरों द्वारा स्थलन

1. सारङ्गीन गिल नेट (चालवले)

इसका प्रचालन सभी सालों में होता था देशज गिअरों से मिलने-वाला मत्स्य स्थलन के 71.5% इसका देन था। सिर्फ सन् 1981, 82 सालों में इसके द्वारा प्राप्त पकड़ औसत पकड़ के नीचे गिरा था।

अक्टूबर से दिसंबर तक की अवधि इस गिअर का अनुयोज्य मौसम ठहरा है। इस गिअर की मुख्य पकड़ है सारङ्गिनेल्ला गिन्नेसा। पकड़ का प्रतिशत 41 था।

2. बिफ्ट नेट (पाखलै)

इसका प्रचालन सब महीनो में होता था। सुरमई, द्यूना, करैन्जिडस, पेचेंस, कोरैनीमस और बैराकुडा आदि इसके द्वारा पकड़ी जाने वाली मुख्य मछली थी। इसकी वार्षिक कुल पकड़ 399.2 टन था। जनवरी से अप्रैल तक की अवधि में अच्छी पकड़ मिली थी।

3. बिफ्ट नेट (पोडिवलै)

छोटे आलाक्षियों से युक्त यह नेट का प्रचालन सारे महीनों में होता है। इस से मध्यम आकार के वेलापवर्ती और तलमज्जी जातियों के मत्स्य पकड़े जाते हैं। “पोडिवलै” की वार्षिक मत्स्य पकड़ में 1981 और 1985 में उतार-चढ़ाव महसूस हुई 1985 में पकड़ 294.3 टन था तो 1981 में 23.3 टन था। वार्षिक प्रति यूनिट पकड़ भी 1982 के 28.3 कि. ग्रा. से 1985 में 79.5 कि. ग्रा. तक की वृद्धि दिखायी। मध्यम आकार की द्यूना, पकड़ के 18.4% था। इसके अलावा सुरमई

(16.1 %) कैरोसेन्टरस (12.4%) इत्सा टोली, पेचेंस, करैन्जिडस और बैराकुडा आदि भी इससे पकड़े जाते थे। अधिकांश महीनों में इसके प्रचालन से अच्छी पकड़ मिली।

4. हान्ड लैन (तूण्डल)

इस अवधि के दौरान, वर्ष में औसत 4,146 तूण्डल यूनिटों का प्रचालन हो रहा था। इसका स्थलन 308.8 टन था। एक वर्ष में इसके द्वारा पकड़ी गयी मछली 240.6 टनों से 378.8 टनों तक की वृद्धि दिखायी। प्रति एकक पकड़ 1984 में 58.6 कि. ग्रा. था। सन् 1979 में यह 130.2 कि. ग्रा. था। इसके द्वारा पकड़े गये मुख्य मछली नेमिन्टेरस था। लेत्रिनिड्स (20.4) बीलोन (10.3%) करैन्जिडस, सेरानिड्स, अन्य पेचेंस और बालिस्टिड्स इसके द्वारा पकड़े गये अन्य मत्स्य थे। तूण्डल मत्स्यन के लिए उत्तम काल जनवरी से मार्च अभिलेखित किया गया।

5. लंबी डोर (आयिरंकाल तूण्डल)

टूटिकोरिन इस मात्स्यिकी गिअर के लिए मशहूर है। एक साल में औसतन 4,375.0 लंबी डोर का प्रचालन होता था और इसके ज़रिए 424.3 टन पकड़ भी अभिलेखित किया था। इसका प्रचालन लगभग सारे महीनों में होता था। लंबी डोर द्वारा पकड़ में भारी उतार-चढ़ाव भी दिखायी पड़ी। सन् 1981 में प्राप्त पकड़ 133.0 टन, सबसे कम था तो 1985 में 693.6 टन की बढ़िया पकड़ मिली। प्रति एकक पकड़ 1980 में अधिक था। बड़े पेचेंस, सुरा, रे, करैन्जिड्स, सुरमई और शिंगडी आदि पकड़ में मुख्य थे। स्थलन के 29.4 % लेत्रिनिड्स, 21.7 % सेरानस और 15.6 % सुरा थे। जनवरी, फरवरी, अगस्त और सितंबर लंबी डोर एककों के स्थलन के लिए अनुयोज्य था।

6. ट्रॉल लाइन (ओडक्कायिक)

टूटिकोरिन में सभी सालों में इसका प्रचालन चलता रहता है। एक साल में औसतन 2309 एकक चलाया और इसके ज़रिये 212.4 टन पकड़ भी प्राप्त हुई। प्रति एकक पकड़ 92.7 कि. ग्रा. तक आया। ट्रॉल लाइन का अधिकतम स्थलन 1979 में हुआ था। इसके ज़रिए मुख्यतः सुरमई (57.9 %), राफिसेन्ट्रोन (11.6 %) और द्यूना (10.2 %) पकड़े गये। अक्टूबर से जनवरी तक की अवधि ट्रॉल लाइन मत्स्यन के लिए अनुयोज्य निकला।

7. लॉबस्टर नेट (सिंकि बलै)

प्रतिवर्ष यहाँ औसतन 1,161 सिंकि बलै एककों का प्रचालन होता है। कुल पकड़ 105.2 टन था। औसत प्रति एकक पकड़ काफी उँचा (91.9 कि. ग्रा.) था। सब से उच्चतम पकड़ 123.8 कि. ग्रा., 1981 में प्राप्त हुई। महाचिंगट कीर कर्कट, पकड़ में कम थे। सिंकि बलै स्थलन में मुख्य, पेचेंस, रे, चिंगट करैन्जिड्स और शुक मीन थे। पकड़ के 18.7 % लेत्रिनिड्स, 16.8% रे और 16.4 % ड्यप्रमा थे। पकड़ में महाचिंगटों का देन 1.8% था। इस संभार के लिए अगस्त से अक्टूबर तक की अवधि अनुयोज्य निकला।

8. बोटम सेट नेट (तिरुक्काय बलै)

इसका प्रचालन विशेषतः मई से अक्तूबर तक की अवधि में होता है। बड़े और तलवासी मछलियों को पकड़ने के लिए इसका उपयोग करता है। प्रतिवर्ष औसतन 1800 तिरुक्काय बलै एकड़ों का प्रचालन हुआ और प्रति एकड़ के लिए 129.4 कि. मी. के साथ 219.8 टन मत्स्य का स्थलन भी हुआ। अधिकतम पकड़ प्रति एकड़ 1979 में और निम्नतम 1980 में प्राप्त हुई। इसके ज़रिए पकड़े गये मुख्य मत्स्य बड़ा सुरा, रे, स्केट्स आदि थे। मई, जून, अगस्त, और सितंबर में इस गिअर के ज़रिए अच्छी पकड़ प्राप्त हुई।

9. तट संपाशक (कर बलै)

टूटिकोरिन में साधारणतया इसका प्रचालन तट्टी होता है। औसतन 51 तट संपाश एकड़ों का प्रचालन 5.0 टन की पकड़ के साथ अभिलेखित की गयी। मुख्य पकड़ विविध प्रकार की छोटी मछली थी। इसके अलावा बेलोन और हेमिराम्फस (19.6%) सीनेअइड्स (13.4%) और लियोनार्थिड्स (13.1%) आदि भी थे।

10. झोंगा जाल (तल्लुमडै)

इसका प्रचालन विशेषतया झोंगी पकड़ने के लिए करता है। लेकिन झोंगों के अतिरिक्त अन्य छोटी मछलियाँ भी इस संभार से पकड़ी जाती हैं। हाल ही में परंपरागत धीवरों के बीच इसका प्रचार बड़ा है। प्रति एकड़ पकड़ 1985 में अधिक थी। इसके ज़रिए पकड़े गये मत्स्यों में लियोनार्थिड्स मुख्य था। झोंगी, सानेइड्स, आदि के अतिरिक्त हिल्सा टोली, कर्कट और विविध प्रकार की अन्य मछलियाँ भी इस संभार के ज़रिए पकड़ी गयी थी। फरवरी से अप्रैल तक प्रति एकड़ पकड़ काफी अच्छी थी।

11. विस्फोटक रीति

सन् 1980 में कुछ मत्स्यों को विस्फोटक वस्तुओं के उपयोग करके पकड़ी जाती थी। इसकी धीमी प्रयोग से मत्स्य निश्चलावस्था में पानी के उपरितल पर आते हैं। करैन्जिड, पेचें आदि को इसी प्रकार पकड़ी जाती थी।

स्पीज़ीज़ मिश्रण

टूटिकोरिन तट के परंपरागत मात्स्यिकी में विविध प्रकार के मछली, झोंगी, महाचिंगट और कर्कट आदि शामिल हैं। देशज मछलियों और संभारों से प्राप्त मुख्य मात्स्यिकी लेस्सर सारडीन, करैन्जिड्स, सुरमई, मनंगु आदि चेलापवर्ती ग्रुप थे। सुरा, रे, पेचेंस आदि तलमज्जी ग्रुप की मछली भी इसके ज़रिए पकड़ी जाती थी। झोंगें महाचिंगट और कर्कट वाणिज्य की दृष्टि में मुख्य थे।

परंपरागत गिअरों से पकड़ी गयी मछलियों में लेस्सर सारडीनस और सरडिनेला एस. पी. पी. आगे थे। सितंबर से दिसंबर तक की अवधि में लेस्सर सारडीन की भारी पकड़ अभिलेखित की।

टूटिकोरिन के परंपरागत धीवरों से पकड़ी गयी तलमज्जी ग्रुप में मुख्य था पेरुस। यह कुल स्थलन के 8.2 % था। “कजवा” और “कोडुआ” नाम से पुकारे जाने वाले बड़े आकार के पेरुस टूटिकोरिन में अक्सर दिखाये पड़ते हैं। ये साल भर प्राप्त होता है।

सुरा, रे, स्केट्स आदि कुल पकड़ के 5.9 % होता है। बड़े आकार के सुरा और रे को पाखलै, तिरुक्काय बलै आदि से पकड़े जाते हैं। जून से सितंबर तक की अवधि, सुरा, रे और स्केट के लिए अनुयोज्य होता है।

टूटिकोरिन में पकड़े जानेवाले सुरमई स्कोम्बरोमोरस एस. पी. पी. वहाँ के उत्कृष्ट मछली है। इसे टूल लाइन और ड्रिफ्ट जाल के ज़रिए पकड़ा जाता है। एक साल में स्थलित कुल सुरमई औसत मत्स्य पकड़ के 4.2% होता है। नवंबर से जनवरी में अच्छा स्थलन अभिलेखित किया।

कैरैक्स वाणिज्यिक पकड़ की प्रतिनिधि है। इसका स्थलन कुल स्थलन का 3.0% होता है। इसका उच्चतम पकड़ जुलाई में रिपोर्ट की गयी है।

सरडिनेला गिल नेट और झोंगा जाल तल्लुमडै की मुख्य पकड़ है मुल्लन। कुल पकड़ का 2.5% हिस्सा इसका होता है। जनवरी से अप्रैल तक के समय इसकी पकड़ के लिए अनुयोज्य है।

सारडिनेला गिल नेट के द्वारा पकड़े जानेवाले मत्स्यों में मनंगु का प्रमुख स्थान है। जनवरी से मार्च तक की अवधि पकड़ के लिए उचित समय है।

नेमिटेरेस औसत वार्षिक स्थलन के 1.7 % है। इसे रज्जु के ज़रिए पकड़े जाते हैं। नवंबर के महीने में अच्छा स्थलन होता है।

तारली या नल्लामस्ति सारडिनेला लॉबिसेप्स टूटिकोरिन के परंपरागत मात्स्यिकी में एक छोटी मात्स्यिकी है। इसका टूटिकोरिन में उतना महत्व नहीं है।

स्फैरिनिया जिसे साधारणतया बैराकुडा कहते हैं टूटिकोरिन का स्थिर मात्स्यिकी है। इसे पोडिबलै से पकड़ा जाता है। अक्तूबर से दिसंबर तक का समय इस मात्स्यिकी के लिए अनुयोज्य है।

पाखलै और लंबी बोर का मुख्य घटक है शिंगडी मछली। सिंकि बलै के ज़रिए वार्षिक स्थलन 9.3 टन या टूटिकोरिन के शिंगडी मात्स्यिकी के लिए मार्च और अप्रैल अनुयोज्य महीने हैं।

परंपरागत गिअरों के द्वारा ट्यूना और बिल फिश पकड़े जाते हैं। जून से सितंबर तक की अवधि में भारी पकड़ मिलती है।

कैरोसेन्टरस और हिल्सा टोली का दिन यथाक्रम 64.5 और 15.1 टन है। कैरोसेन्टरस बाल बलै और पोडि बलै से और हिल्सा टोली पोडि बलै और तल्लुमडै से पकड़े जाते हैं। अगस्त और दिसंबर कैरोसेन्टरस के लिए और मार्च और अप्रैल हिल्सा टोली मात्स्यिकी के लिए उचित है।

कोरिनेम एस. पी. पी., राकिसेन्ट्रोन और बेलोनिड्स अच्छा खाद्य मछली है और ये भारी मात्रा में पकड़ी जाती है।

अभ्युक्तियाँ

टूटिकोरिन के मत्स्य उत्पादन के वर्षानुक्रम विश्लेषण यह साबित करता है कि परंपरागत सेक्टर विकास की ओर बढ़ रहा है। फिशिंग तकनीक अपनाने से मात्स्यिकी और भी बढ़ने की संभावना है।



मद्रास में कोवलम के अपतटों की पकड़ में अप्रायिक जीवों का जमाव*

मद्रास के दक्षिण भाग में कोवलम की खाड़ी में अगस्त-सितंबर के दौरान असामान्य मछलियाँ पकड़ी गयीं। मछुओं के अनुसार 'वन्दल तनीर' या तटीय पानी की आविलता इसका कारण है। इस असामान्य परिघटना पर चलाये निरीक्षणों का विवरण नीचे प्रस्तुत है। मत्स्यन: मत्स्यन केलिये बोट संपाश, टूल-जाल, गिल-जाल आदि का उपयोग किया गया। मत्स्यन केलिये 1-2 घण्टे लिये गये। इस समय समुद्र स्वच्छ और आविल देखा गया। प्रवाल मछली, मुल्लन, फीतामीन, सोल, सुरा, सर्पमीन, झींगा आदि पकड़ी गयी मुख्य मछलियाँ थी।

हाइड्रोग्राफिकल पारमीटर्स: घटना का सात दिन पहले पानी का तापमान 28°C था। चौथे दिन में यह 26°C हो गया और सातवें दिन में 24.5°C । इसके बाद धीरे धीरे तापमान बढ़कर 27°C हो गया।

*सी. एम. एफ. आर. आई. के मद्रास अनुसंधान केन्द्र के डी. वी. राधाकृष्णन, एम. कतिरवेल, के. देवराजन, एम. विजयकुमारन, पी. पूवन्न, आर. तंगवेलु, के. शाहुल हमीद, एस. शंकरलिंगम, ए. रामकृष्णन और वी. तंगराज सुब्रह्मण्यन द्वारा तयारित।

अभ्युक्तियाँ: समीपस्थ प्रदेशों में पूछ ताछ करने पर मालुम हुआ कि कोवलम में अगस्त-सितम्बर के महीनों में हर साल यह परिघटना होता है। लेकिन निकट के सालों में ही इसकी ओर ध्यान देना लगा है। 1982 में विवेकानन्दन ने तमिलनाडु में इस प्रकार की एक परिघटना की ओर ध्यान दिलाते हुये मन्तव्य किया था कि यह उत्सवण के समान की हुए परिघटना है। कोवलम में भी उत्सवण की परिघटनायों जैसे पानी के तापमान में क्रमशः घटती, उपरितल पानी में विलीन ऑक्सिजन की घटती आदि दिखायी पड़ी। इसके अलावा वेलापवर्ती मछलियाँ जैसे सोल, सुरा, सर्पमीन, प्रवाल-मात्स्यिकी और साधारण रूप से उथले पानी से न मिलनेवाली मछलियाँ इस समय प्राप्त हुईं। प्रवाल-मात्स्यिकी और अगाध जल मात्स्यिकी के जमाव का कारण ऑक्सिजन कम गहरे पानी का तटीय प्रवाह हो सकता है। अकनथोसिपोला एस. पी. अगाध जल मछली भी इस समय खाड़ी में दीख पड़ी। पत्थरों में चिपकर रहनेवाले मलस्क, कीनोडड, गोरगोनिया आदि वर्गों की उपस्थिति यहाँ हुई गंभीर तटीय प्रवाह की ओर प्रकाश डालती है। भारत के तटों में अनेक तटीय प्रवाह रिपोर्ट की गयी है और उस में अधिकतम पश्चिमी तट से हुई है। अब तमिलनाडु में अगस्त सितंबर में देखी गयी यह परिघटना तमिलनाडु के उत्तरी तट की तटीय प्रवाह की ओर प्रकाश डालती है।



GUIDE TO CONTRIBUTORS

The articles intended for publication in the MFIS should be based on actual research findings on long-term or short-term projects of the CMFRI and should be in a language comprehensible to the layman. Elaborate perspectives, material and methods, taxonomy, keys to species and genera, statistical methods and models, elaborate tables, references and such, being only useful to specialists, are to be avoided. Field keys that may be of help to fishermen or industry are acceptable. Self-speaking photographs may be profusely included, but histograms should be carefully selected for easy understanding to the non-technical eye. The write-up should not be in the format of a scientific paper. Unlike in journals, suggestions and advices based on tested research results intended for fishing industry, fishery managers and planners can be given in definitive terms. Whereas only cost benefit ratios and indices worked out based on observed costs and values are acceptable in a journal, the observed costs and values, inspite of their transitionality, are more appropriate for MFIS. Any article intended for MFIS should not exceed 15 pages typed in double space on foolscap paper.