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951 RECENT EXPLOITATION TREND OF OIL SARDINE ALONG TAMIL NADU - PONDICHERRY COAST

P.K. Mahadevan Pillai, K.Ramani and V. Radha Krishnan Nair
Central Marine Fisheries Research Institute, Cochin

The Indian oil sardine *Sardinella longiceps*, though a non-conventional resource of the east coast, supports now a regular fishery of high magnitude especially along Andhra Pradesh and Tamil Nadu - Pondicherry coasts. The estimated annual average landing from east coast during the period 1993-97 was 60,638 tonnes against 46,000 t obtained along west coast thereby showing the potential of this new resource, especially along the southern maritime states of the east coast. It has been observed that the oil sardine catch during 1993-97 increased to more than three fold in Andhra Pradesh from that of the previous five year period 1988-92 while along Tamil Nadu - Pondicherry coast the catch almost doubled and recorded 80% of the total oil sardine production of east coast.

Some informations are available on the fishery trend of oil sardine during 1981-86 and 1985-90 (*Mar. Fish. Infor. Serv., T & E Ser.*, **88**, 1988 and **119**, 1992). The present study complements the information on the recent trend of exploitation along Tamil Nadu - Pondicherry coast.

Trend of fishery

The period 1991-97 recorded 45% of total all India production of oil sardine from east coast of which the annual average of nearly 43,200 t (80%) was obtained along Tamil Nadu - Pondicherry coast constituting 10% of the total marine fish production. Catch trend along the coast showed an all time recorded high yield of nearly 80,000 t in 1977 (Fig. 1). Progressive increase of the annual average yield during each 5 year period 1973 - '77 to 1993 - '97 indicated visible increase in the magnitude of the fishery especially since 1990 (Table 1).

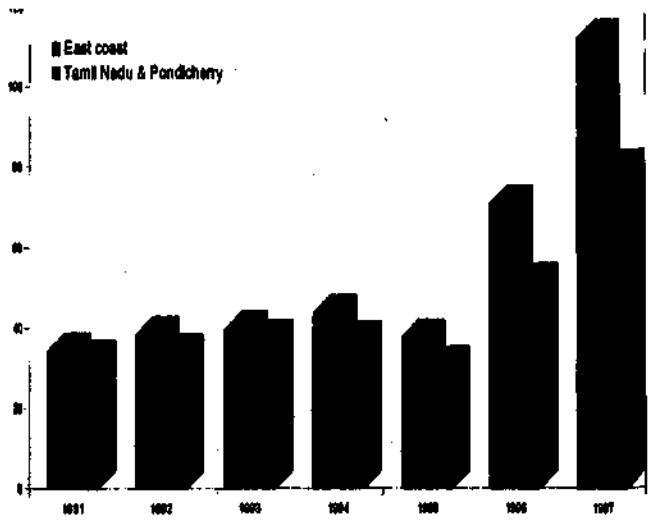

Fig. 1 : Oil sardine landings of Tamil Nadu - Pondicherry coast during 1991-97 in relation to total production along the east coast

TABLE 1. Average oil sardine landings during 1973-77 to 1993-97 (in tonnes) and its percentage to total average fish production of Tamil Nadu - Pondicherry coast.

Period	Average oil sardine landings	% to total average fish production
1973 - '77	152	0.07
1978 - '82	530	0.22
1983 - '87	3,476	1.28
1988 - '92	24,346	7.27
1993 - '97	47,195	11

Gearwise catch trend

The trend of landings by different tackles from various coastal districts of Tamil Nadu including Pondicherry (Table 2) revealed that

47% was exploited by bagnet *eda valai*, the operation of which is restricted at present to the coastal waters from Chengalpet to Quaide-Milleth districts (prior to recent change in nomenclature of coastal districts) and Pondicherry. Annual average catch per unit effort of oil sardine during 1991-97 by *eda valai* units indicated maximum of 1386 kg and 1187 kg from Quaide-Milleth and South Arcot district respectively (Table 3). The sardine gillnets known locally by different names such as *kavala valai, thatta valai, mathi valai and chala valai* operated almost throughout the coastal waters realised 25% of the total oil sardine catch during the period.

It was remarkable to observe that 23% the total exploited oil sardine resources was caught by trawlers. By virtue of unprecedented heavy landings in pair trawlers at Pamban, Rameswaram and Mandapam, recorded highest annual average of about 6500 t constituting 64.6% of the total oil sardine recorded in trawlers. Unprecedented heavy landing of oil sardine predominantly by pair trawlers operated 15-20 km off the shore at depth of 12-16 m during January - February period have been recorded at Rameswaram-Pamban area (*Mar. Fish. Infor. Serv., T & E Ser.*, **117**, 1992).

Other nets including shore seines and boat seines operated to a limited extent caught 5% of the landings. Unusually large oil sardine landings by shore seines around Mandapam area has been reported while at Tuticorin, oil sardine formed 2% of the shore seine catches (*Mar. Fish. Infor. Serv., T & E Ser.*, 104 & 123, 1992).

Exploitation trend of the resource along Tamil Nadu - Pondicherry coast during the period under study suggested that the annual average of nearly 44,000 t constituting 40% of the total oil sardine production is reported along Quaide-Milleth district. South Arcot district ranked next (19.8%) followed by Ramanathapuram (16%), Pondicherry (9.2%), Chengalpet (6.2%), Madras (4.7%) and Pudukottai (2.2%).

Seasonal trend

Analysis of the seasonal oil sardine fishery during 1991 - '97 indicated a productive second quarter (April - June) and third quarter (July - September) accounting for 33% and 30% of the total catch respectively. Earlier studies also have reported heavy landings during May and June along Madras coast (*Mar. Fish. Infor. Serv., T & E Ser.*, **96**, 1989). Fishery season for oil sardine in Visakhapatanam coast is reported to be June - December (*Mar. Fish. Infor. Serv., T & E Ser.*, **133**, 1994) and a similar trend during 1985-90 has been reported along Tamil Nadu coast (*Mar. Fish. Infor. Serv., T & E Ser.*, **115**., 1990). The present study indicating a productive April - September period probably suggests the characteristic seasonally fluctuating oil sardine fishery.

Gearwise seasonal landings indicated that the fishery exploited by major nets like bagnet and gillnet operated during the productive seasons recorded a major share of 72% (Fig.2). The abundance of oil sardine in trawlers was observed to be highest in the first quarter (January - March) as a consequence of intensive

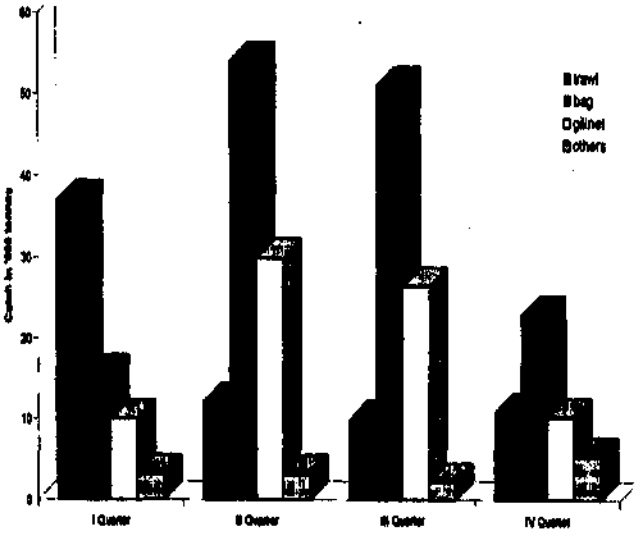

Fig. 2 : Seasonal abundance of oil sardine obtained in different gears during 1991-97 from Tamil Nadu - Pondicherry coast.

TABLE 2. Average oil sardine catch (in tonnes) during 1991-97 by different gears along the coastal districts of Tamil Nadu and Pondicherry

Districts	Gear				Total
	Trawl net	Bagnet	Gill net	Others	
Chengalpet	0	1458(7.1)	1023(9.4)	230(11.6)	2711(6.9)
Madras	0	1553(7.6)	303(2.8)	177(8.9)	2033(4.7)
South Arcot	5.(01)	6315(31.9)	1731(15.8)	340(17.2)	8591(19.8)
Quaide-Milleth	2410(4.1)	8312(40.6)	6000(55.0)	498(25.3)	17220(39.9)
Tanjavoor	139(1.4)	0	34(0.3)	0	173(0.4)
Pudukottai	952(9.5)	0	0	0	952(2.2)
Ramanathapuram	6455(64.6)	0	243(2.2)	251(12.7)	6949(16.0)
Nellai	0	0	0	0	0
Katabomman					
Chidambarnar	11(90.1)	0	423(3.9)	57(2.9)	491(1.1)
Kanyakumari	0	0	187(1.7)	76(3.8)	263(0.6)
Pondicherry (U.T)	17(0.2)	2628(12.8)	969(8.9)	349(17.6)	3943(9.1)
Total	9989	20446	10992	1978	43335
Precentage	23	47	25	5	

Table 3. The catch per unit effort (in kg) of *eda valai* in various coastal districts of Tamil Nadu and Pondicherry during 1991-97

District/year	1991	1992	1993	1994	1995	1996	1997	Average
Chengalpet	1,006	1,008	266	416	344	1,115	694	693
Madras	128	427	391	469	153	167	879	374
S.Arcot	481	606	603	620	3,427	1,463	1,106	1187
Pondicherry	106	705	580	504	68	243	1,546	536
Quaide-Milleth	960	1,150	1,305	979	2,821	1,203	978	1316

operations of pair trawlers. Though the presence of oil sardine in shrimp trawlers was almost a regular feature, among the trawlers, pair trawlers accounted for 65% of the landings of oil sardine. Abundant quantity of oil sardine in shrimp trawlers off Visakhapatanam was reported in the month of January forming 54% of annual trawl catch followed by February (16%) and indicated movement of oil sardine and other sardines to deeper waters during January - February and February - March respectively as has been revealed by the diminishing catch rates of these groups in gear operated in nearshore waters during that period (*Mar. Fish. Infor. Serv., T&E Ser.*, **133**, 1994). The landings of oil sardine by shore seines and boat seines were high during the fourth quarter (October - December).

Biological characteristics

Detailed biological studies on oil sardine along the east coast are limited to a few references on the length ranges of the species in the fishery, availability of mature specimen at a few centres and on the reported occurrences of eggs and larvae. Information available so far indicated that oil sardine caught along the east coast ranged in size between 20 and 207 mm total length. The size ranges of fishes obtained in earlier observations in various gears at few centres are given in Table 4. As gillnet was the major gear at most of the centres, large sized fish around 125 mm and onwards formed major catch whereas fishes caught by bagnets, shore seines and trawl nets were small.

The presence of eggs and larvae of *Sardinella longiceps* along the Madras coast has been established (*Treubia* **25**(2) : 202 - 213, 1960). Based on the frequent occurrence of mature oil sardine along the coast, it has been suggested that oil sardine has prolonged spawning season during May - June to September - October (*Indian J. Fish.* 31 (3)). Ripe fishes were encountered during May - August along Madras coast and young fishes (60-64mm) observed in boat seine catches during November (*Mar. Fish. Infor. Serv., T & E Ser.*, **96** 1989). Further observations have revealed fishes of advanced maturity condition at Tuticorin in September 1982, May 1983 and March 1984 and at Parangipettai during July - September 1989 (*Mar. Fish. Infor. Serv., T & E Ser.*, **88**, 1988). Fishes caught at Pondicherry during November - December 1993 had gonad in first and second stage of maturity (*Mar. Fish. Infor. Serv., T & E Ser.*, **16**, 1985). The spawning period of oil sardine at Tuticorin was observed to be October - November (*Mar. Fish. Infor. Serv., T & E Ser.*, **120**, 1993). As seen from the fecundity studies, the species along Visakhapatnam coast appears to have a prolonged spawning period with intense spawning activity during December - February, April - June, and August - October. It was also premised that the species attain maturity at 137 mm and at the completion of 3, 6, 9, 12, 15 months of life it attains average length of 99.0, 139.5, 183.8 and 195.4 mm respectively (*Mar. Fish. Infor. Serv., T & E Ser.*, **120**, 1993).

As the oil sardine provides a regular fishery of considerable magnitude especially along Andhra Pradesh and Tamil Nadu - Pondicherry coasts, detailed investigations on length frequency and spawning characteristics of the species at selected centres deserve special attention to study the dynamics and predict the resources availability in the years to come.

Remarks

The oil sardine fishery, once considered as a non-conventional resource of the east coast, now appears to be an important fishery of high magnitude particularly along Andhra Pradesh and Tamil Nadu- Pondicherry coasts showing progressive increase in catches. Based on the present study, it appears that by extending the operations of bagnet *eda valvai*, which registered 47% of the total oil sardine production to those maritime districts of Tamil Nadu where it has not yet been introduced may bring high returns.

Reports suggest that the oil sardine fishery obtained along the coast has benefited the fishers only to a limited extent. Owing to lack of demand for local consumption, large portion of oil sardine was marketed outside the state. During the period of unprecedented heavy landings considerable quantities were sun-dried and supplied to manufacturers of poultry feed.

Oil sardine catches are reported to have been obtained along the east coast of India in areas close to harbours, back waters and river mouths indicating its affinity particularly during

Table 4. Size range of oil sardine (in mm) recorded in different gear at few centres along Andhra Pradesh, Tamil Nadu and Pondicherry

Centres	Gear				
	Trawl net	Bagnet	Gill net	Shore seine	Boat seine
Gopalpur	N.L.	0	120-175	50-100	50-100
Kakinada	160-195	0	170-195	125-198	0
Visakhapatnam	72-175	0	100-175	92-187	40-205
	70-165	0	102-187	0	57-147
Pondicherry	0	0	140-202	0	0
Madras	0	0	126-195	0	60-64
Parangipettai	0	0	102-193	0	0
Cuddalore	0	140-169	0	0	0
Pazhayar	0	110-114	0	0	0
Kaveripattinam	0	95-170	0	0	0
Tuticorin	0	0	120-185	0	0
Rameswaram	165-176	0	0	0	0
Pamban	165-176	0	0	0	0
Mandapam	165-176	0	0	0	0

N.L : No landings reported.

juvenile phase to areas where there is admixture of fresh and brackish water (*Mar. Fish. Infor. Serv. T & E Ser.*, **88**, 1988). Based on the circulation patterns in Arabian Sea and the possibility of oil sardine entering the Bay of Bengal from the south-west coast of India along with the surface currents driven by the south-west monsoon during May - August appears to be a reasonable explanation for their fishery in the region. The fish seems to maintain this coastal habitat till December but come early under the influence of the clockwise circulation that sets in towards the latter part of November - January period and get carried off the coasts in the subsequent period (*Mar. Fish. Serv. T & E Ser.*, **133**, 1994).

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