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P. B. No. 2704, E. R. G. Road, Cochin-682 031, India

19- COMMERCIAL FISH TRAWLING OVER PEARL AND CHANK BEDS IN THE GULF OF MANNAR-A NEW DIMENSION TO PROBLEMS IN SHELL FISHERIES

H. Mohamad Kasim
Central Marina Fisheries Research Institute. Cochin-682031.

ABSTRACT

Examination of the mechanised boat landings at Tuticorin during 1984-86 and 1985-86, of the sacred chank *Xancus pyrum* revealed that nearly 30.000 numbers of these sheila have been landed on an aveiage in a year during these two years. The paper gives an analysis of the catches, size range of the chanks landed, areas fished and indicates the need for conservation policy to protect the natural beds from being disturbed.

INTRODUCTION

The dichotomy in the physico-chemical, flora and faunistic constitutents of the habitat of pearl oyster and chank has been revealed from the studies on the ecology of the pearl and chank beds by SCUBA diving (Mahadevan and Nayar 1966, 1968, 1974). The survival of the sedentary pearl oyster appear to be intricate as they are constantly exposed to the adverse effects of the discharges of different riverine systems along the Gulf of Mannar, violent currents, long swells which throws the bottom silt in suspension with the consequence that the area constitutes a negative force. Further, extensive predatiqn by animals like octopuses and echinoderms has also been observed. On the other hand, thqugh the survival of chanks appear to be better by their free living and well protected thick shells with camouflaging colouration of the periostracum which suits the muddy colour of the sandy bottom, the vulnerable stage is considered to be during early development as the young ones during their development in the sedentary egg capsules are rooted to the sandy bottom, constantly exposed to the vagaries of nature. Added to these, the human interference by extensive trawling over the pearl and chank beds for the exploitation of commercially important fishes and prawns which are abundant in these beds poses a new threat to the problems already explained to in the shell fisheries.

With the aim to explore this problem the present study on the commercial fish trawling over pearl and chank beds was initiated in July 1984 at Tuticorin. This paper deals with the quantum and quality of chank landings by commercial trawlers, the availability of chank resource beyond the conventional fishing grounds and as well the effect of trawling over pearl and chank beds.

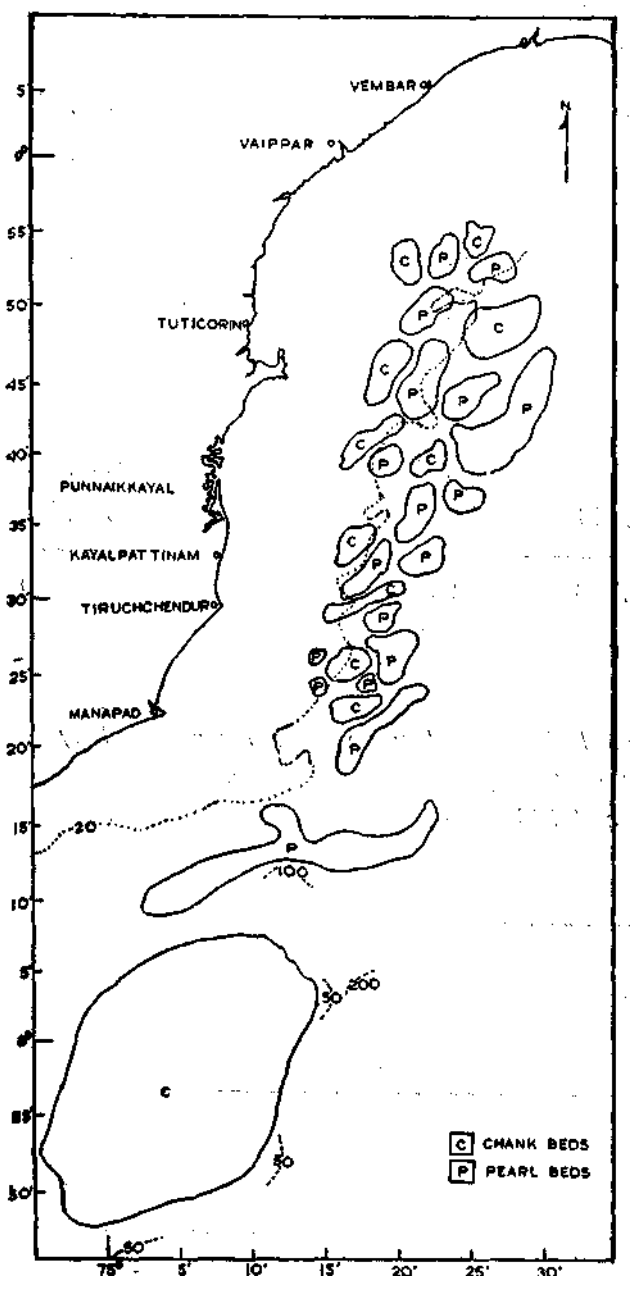
METHODS

Weekly observations were made at the Tuticorin fishing harbour on the catch composition of trawlers. The number of chanks landed by a sample of minimum 10% of the boats was recorded and the length, breadth and weight were recorded at the chank godown of the Tamil Nadu State Fisheries where these chanks are procured by the Department for fixed price. The number of chanks landed were raised to the total units operated on that day and then to the month. Detailed enquiry was also made on the area and depth of fishing arid other relevant informations. In addition to this the data on the chanks landed by diving, different nets and confiscation were obtained from the Tamil Nadu Fisheries Department at Tuticorin.

FISHERY

The methods of fishing for chanks is chiefly by skin diving, and the chanks $fd

randomly caught in hooks & lines, gill and trawl nets also. The important chank and pearl beds in the Gulf of Mannar are shown in Fig 1. The total annual chanks landed during season and non-season from 1971-72 to 1982-83 are given in Table 1 where in the season refers to diving season and the non-season, the period in which chanks are landed by gill and trawl nets. On an average annually 5,96,175 chanks are landed in which 5,68,921 are landed during season and the rest during non season. The full sized good chanks (ie., 64 mm and above) constituted 4,91,016 and the rest 99,030 were wormed and under-sized are landed by skin diving and 5% are landed by nets as the chank catches in the nets are incidental and none of the gears aim at catching shanks exclusively.



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and chank beds along Tuticorin coast from Vambar in the north to Manapad in tha South.

During 1984-85 and 1985-86 as seen from the Table 2 wherein the details of chank landing are given, a total of 3,55,305 chanks were landed by diving and 55,638 were by nets. As the chanks fetch a good price from the private procurers the fishermen try to smuggle good chanks and the Department keeps a check on this by consiscating such chanks. A total of 12,783 chanks were consfiscated during 1984-85 During 1985-86, a total of 90,553 chanks were landed by diving, 52,775 by nets and 2,630 were confiscated. The monthwise total netted chanks and the chanks landed by trawl nets at Tuticorin during these two years are given in Table 3, The length, breadth and weight of the chanks were computed and thB length-weight relationship *for Xancus pyrumis* Log W-. 3 5940 + 2.8475 Log L. The analysis of variance of the above said three factors are shown below.

Source variance	Degrees of freedom	sum of squares	Mean square
Individual factors	156	4.3	0.02756
Samples	2	34.8	17.4000
Total	158	39.1	

$$F = \frac{17.4}{0.02756 - 631.8»'}$$

F ratio 5% 1%
••Highly significant 3.06 4.75

T+wf«i«Bhisftly-sl«mficant correlation between s / o
these three factors.

TABLE 1. *Total chink landings in Tuticorin during season and non-season* ***from 1971-72 to 1982-83.***

Year	Season		Non- season		Total	
	Full size	Under size & Wormed	Full size	Under size & Wormed	Full size	Under size & Wormed
1971-72	1,08,189	6,354	14,061	6,351	1,22,250	39,367
1972-73	3,70,763	1,01,161	1,252	554	3,72,015	1,01,715
1973-74	3,56,532	1,03,334	2,189	1,385	3,58,721	1,04.719
1974-75	5,48,393	1,26,850	10,587	2,324	5,58,930	1,29,174
1975-76	4,755	8,980	7,605	4,420	12,360	13,400
1976-77	No fishing		9,071	16.289	9,071	16,289
1977-78	No fishing		10,416	19,408	10,416	19,408
1978-79	10,11,345	1,95,540	8,265	7,112	10,19,610	2.02,652
1979-80	7,87,815	1,58,376	13,081	9,732	8,00,896	1,68,108
1980-81	7,51,145	1 79,991	26,722	21,957	7,77,867	1.01.948
1981-82	7,64,459	1,13,272	31,076	26,741	7,95,535	1.40,013
1982-83	10,11,178	1,18,672	43,546	32,898	10,54,724	1.51,570
Average	4,76,210	92,711	14,623	12,431	4,91,016	99,030

TABLE 2. *Total number of different sizes of gdod chanks and wormed chanks obtained by diving, net operations and confiscation, their percentage composition during 1984 • 85 and 1985 - 86.*

SIZE	1984-85						1985-86					
	DIVED		CONFISCATEO		NETTED		DIVED		CONFISCATED		NETTED	
	Number of chanks	%	Number of chanks	%	Number of chanks	%	Number of chanks	%	Number of chanks	%	Number of chanks	%
Below 64 mm	15,786	4.4	641	5.0	4,552	8.0	8,361	9.2	139	5.3	3,136	5^9
64 to 70 mm	1,67,135	47.0	3,160	45.6	26,405	46.6	43,098	47.6	858	32.6	25,584	48.5
Above 70 mm	88,936	25.0	7,811	61.1	9,463	16.7	23.879	26.4	1,249	47.5	7.10817.3	
Wormed	83,448	23.6	1,171	9.2	16,218	28.7	15,215	16.8	384	14.6	14,947	28.3
TOTAL	3,55,305		12,783		66,638		90.553		2,630		52,775	

TABLE 3. *Monthwise total netted chanks and chanks landed by commercial trawlers at Tuticorin during 1984-85 and 1985 86.*

MONTH	1984-85		1985 86	
	Total netted chanks	Trawlnet chanks	Total netted chanks	Trawlnet chanks
July	7,323	3,938	7,043	3,882
Aug.	12,087	7,782	6,576	3,275
Sep.	9,573	6,210	1,355	828
Oct.	6,845	3,705	8,581	5,035
Nov.	1,763	820	749	480
Dec.	868	550	3,036	1,845
Jan.	4,379	2,015	249	105
Feb.	1,262	695	1,083	785
Mar.	2,531	1,620	1,855	1,020
Apr.	1,370	798	11,464	6,810
May	3,928	1'895	7,834	4,340
June	4,709	2,025	2,950	1,225
TOTAL	56,638	32,053	52,775	29,630

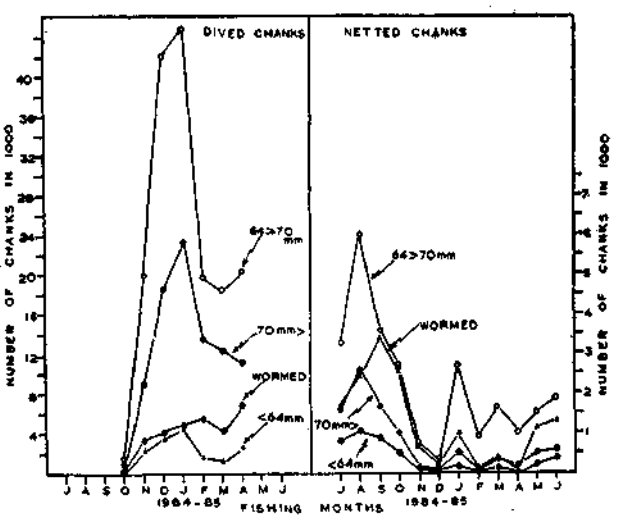

Fig. 2. The monthwise chank landings by diving and nets in Tuticorin during 1984-85.

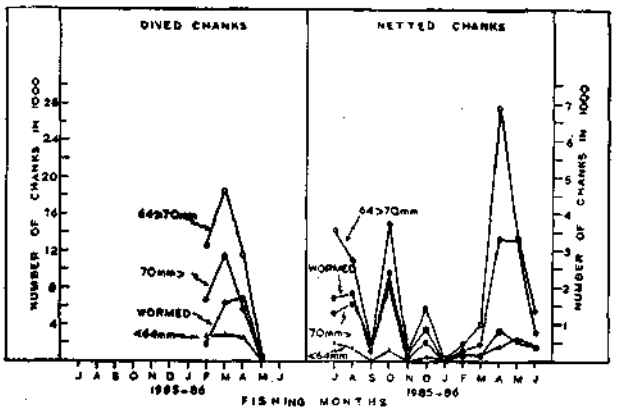

Fig. 3. The monthwise chank landings by diving and nets in Tuticorin during 1985-86

DISCUSSION

Chank landings by mechanised trawlers have not been reported in detail so far. Trawlers do not aim to exploit the chanks and they form an insignificant bye catch which comparatively do not fetch good and continuous return for the boat owners. Mostly the fishing hands share the earnings from the chanks among themselves as an incentive. The chanks measuring 64 mm to70mm ware landed in good numbers, whereas above 70 mm and below 64 mm were landed in less numbers(Table2). Chanks measuring below 64 mm do not fetch any price and are returned to the sea alive. Therefore, the fishermen do not bring smaller chanks ashore. Comparatively the wormed chanks are more in the netted catches as there is no selection (Fig 2 and 3). Among the netted chanks the trawlers landed an annual total of 32,053 and 29,630 during 1984-85 and 1985-86 respectively (Table 3). The peak period of landing is during July-September when the most of the trawlers which are fitted with higher horse power Leyland engines operate off Manapad for mainly prawns, During the other months the chank landing is comparatively low (Table 3).

^^^ occurrence of chanks beyond 20 m ^^p^^ ^^^^^ .^ ^^^ ^^l, ^^^^^ ^^ ^^^ ^kin ^^^^^^ ^^ ^ot ^g^t^^^g generally beyond 20 m (jgpth. Nayar and Mahadevan (1973) have well documented the distribution of chanks and various chank beds beyond 20 m depth within Lat 8° 25'N to 8° 55'N Longitude 75° 15'Eto 78° 35'E in Gulf of Mannar. Present observation also reveals the availability of chanks upto 40m

depth as per the trawler operations in the Gulf of Mannar especially off Manapad where it is reported that good quality chanks are available in depth greater than 20 m. However, the objective of this paper is not to advocate for chank fishing by trawlnet but to highlight the quantum of incidental chank landing by trawlnet and to bring out the possible damage caused by trawling over pearl and chank beds.

The trawling operations necessitate dragging of the net over the bottom causing considerable disturbance and dislocation to the upper crust of the sea floor. This act with particular reference to the chank habitat would cause the food supporting layers for the chank to be affected. Naturally the adult population would suffer. It has been observed by Mahadevan and Nayar (1966) that during the trimester, January-March the chank breeding is intense during which act several males surround one female in the act of copulation. This appears to be a natural process and requisite for laying of egg capsule as the copulation goes on. Trawling during such time in the area would definitely displace these aggregations, interfering with the natural process in the completion of the life cycle of the animal. Even the potential spawners happen to escape such disturbance to complete the process successfully and lay the egg capsules, subsequent sweeping of the foot ropes with sinker chains of the trawlnets appear to cause severe damage to the egg capsules. The sandy beds where the egg capsules are planted are the habitat for the prawns and different fishes also. Most of the trawler units operate for prawns usually off Manapad and during the other seasons for fish off Tuticorin. These grounds are exposed to trawling and consequently enormous numbers of egg capsules are believed to be uprooted thus bringing down the recruitment of the chanks due to high mortality rate at the young stage.

SUGGESTIONS

This study reveals the occurrence of chanks beyond the conventional diving areas and corroborates the findings of Nayar and Mahadevan (1973) in Gulf of Mannar. Therefore, it is felt essential that an intensive survey may be carried out along the coasts to assess the potentiality of this resource by systematic SCUBA diving

Further studies are suggested on the biology, growth, spawning, recruitment, mortality rates, stock position and maximum sustainable yield in addition to various factors which influence the production of chank to formulate proper fishing management regulations.

However, in the mean time the landing of undersized chanks may be further checked by insisting that the smaller chanks should be brought alive to the chank procuring yard and removal of the flesh from smaller chanks should be banned. Further, each diver may be provided with a plastic gauge to check the size of the smaller chanks in the sea itself. In addition to this possession of under sized chanks, dead or alive, by any one may be declared as illegal. These regulations do not involve much monetary expenditure. This may be expected to bring down the fishing mortality of the smaller sized chanks and enhance the chank production.

Though trawling over the chank beds have been recorded to produce adverse effect on the production of chank, considering the economic value of the trawl fishery it is beyond imagination to ban trawling on these grounds. However, by thorough study on the spawning to identify the potential spawning grounds, atleast regulation of trawling of these areas may be thought of by observing closed season during the spawning season ie., during January to March.

Considering the economic value, studies on the captive breeding and development of proper hatchery technique may be attempted

with the view of restocking the depleted waters if necessary, though such a situation has not arisen yet.

Exploitation of chanks beyond the skin diving area may be taken up by introducing SCUBA diving, the advantage of this method has already been highlighted by Nayar and Mahadevan (1973).

CONCLUSION

The sacred chank *Xancus pyrum* distributed along the coasts of Indo-Ceylon sub-continent is commercially exploited to greater extent in Indian coasts. About one million chanks are landed every year from Indian waters which 50% is contributed from Tuticorin coast in Gulf of Mannar. As much as 95% of the catch is landed by skin diving and the rest by nets. The chank landings by trawlnets in Tuticorin is about 30,000 in a year during 1984-86. Considering the commercial value of the chanks, it is suggested to regulate the trawling on the important spawning areas by observing closed season during the breeding season, say from January to March, to conserve this resource at least from the adverse effect of trawling on the recruitment of this resource.

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REFERENCES

MAHADEVAN, S. AND K. NAGAPPAN NAYAR. 1966 Under water ecological observations in the Gulf of Mannar off Tuticorin. VI On the habitat, movements and breeding habits of the chank *Xancus pyrum* (Linn.). *J mar. bio/. Ass. India,* 8 (1) : 1-6.

MAHADEVAN, S. AND K. NAGAPPAN NAYAR. 1968. Under water ecological observations in the Gulf of Mannar off Tuticorin. VII General topography and ecology of the rocky bottom. *J. mar. biol Ass. India,* 9 (1): 1 -6.

MAHADEVAN, S. AND K. NAGAPPAN NAYAR. 1974. Ecology of the pearl oyster and chank beds. *Bull. Cent. Mar. Fish. Res. Inst.* 25: 106-112.

NAGAPPAN NAYAR, K. S. MAHADEVAN. 1973. Chank resources of India. *Proc. Symp. Living Resources Seas around India,* Special Publication, CMFRI : 672-686.