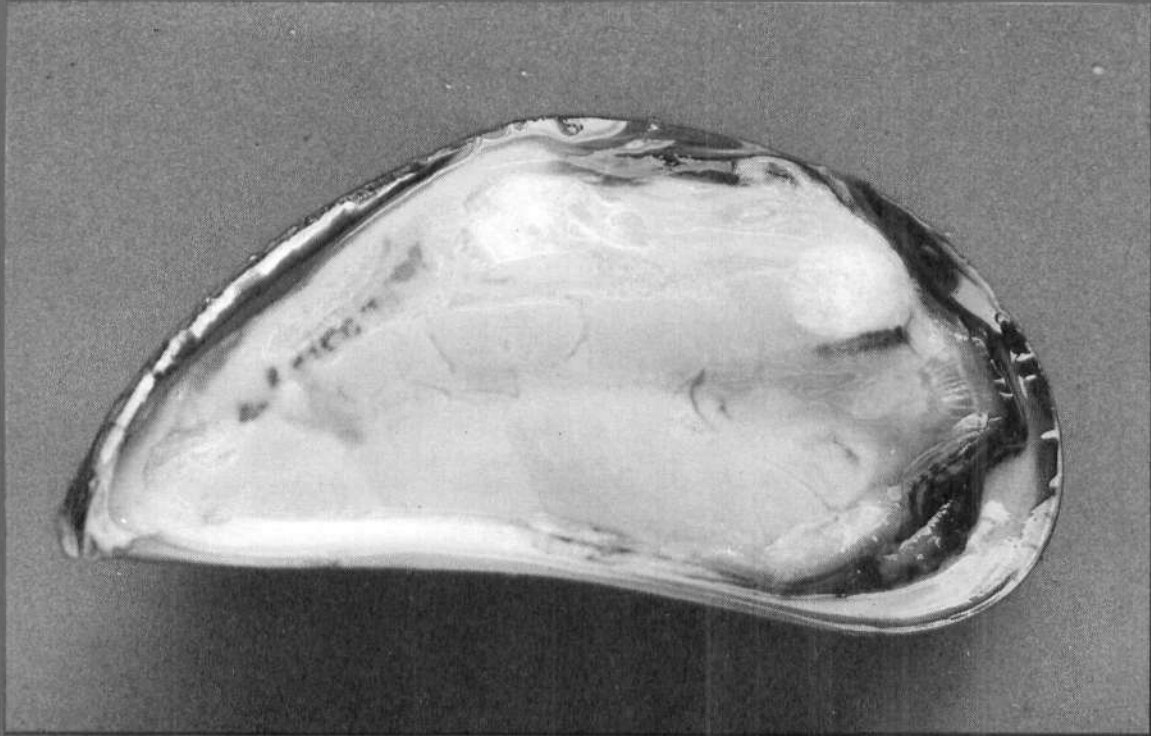




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भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

T.M. Yohannan, U. Ganga, Prathiba Rohit, P.P. Pillai, P.N.R. Nair,
G. Gopakumar, K. Srinivasagan, K.S. Krishnan and M. Samuel Sumithrudu

Central Marine Fisheries Research Institute, Cochin - 682 014, India

Introduction

With the recent spreading of the coastal fisheries in space and time, especially along the southwest coast of India, the catch trends in the mackerel fishery are undergoing a change. Before 1980's the mackerel fishery was highly seasonal along the west coast of India. The active fishing period was restricted to the post monsoon period when the surface gear accounted for the bulk of the catch. Now with the spreading of trawling to deeper waters mackerel is being exploited by this gear from trawling grounds with a depth more than 40 m during summer, especially in the Malabar area. Yohannan and Abdurahiman (*Indian J. Fish.*, 45 (3) : 239-247, 1998) observed that the fish move to the surface during upwelling and spread to deeper waters with the sinking of thermocline. With the improvements in the craft and gear employed in the mackerel fishery (Yohannan and Abdurahiman, *Mar. Fish. Infor. Serv., T & E Ser.*, No. 156 : 11-16, 1998) the exploitation started even during the monsoon season in the Malabar area. With data on the resource available throughout the year a better assessment of the fishery is now possible. Against this background the mackerel fishery data collected from different centres along the east and west coasts of India in 1998 is presented in this report.

Catch trends

The average annual catch of mackerel along the east coast was 7,050 tonnes during 1956-'84. The catches showed more than 4-fold increase in 1985-'94 when the average annual catch was 29,280 tonnes. Along the west coast the catch figures during the similar periods were 57,930 and 1,20,500 tonnes indicat-

ing that the catch has doubled.

From 1998 data it is seen that the monthly catch trends in the nearby centres has a striking similarity. In Karwar and Mangalore the active fishery started in August, reached a peak by September/October and declined by December (Fig.1). In both the centres purse seines contributed more than 85% of the catch. The fishery continued to be seasonal with a short period of active fishery during the postmonsoon period.

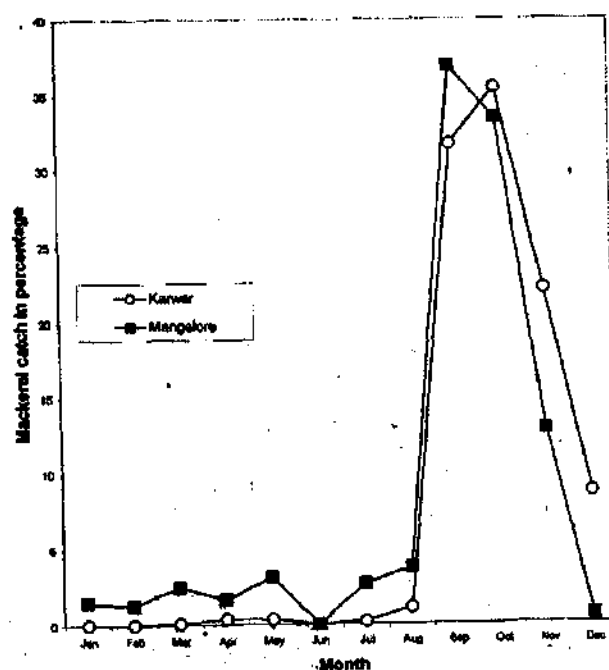


Fig. 1. Monthly percentage contribution to the total mackerel catch of Karwar and Mangalore.

Two peaks in the mackerel catch was observed in Calicut and Cochin (Fig. 2). The first peak was observed in May/June, which is mainly contributed by trawl nets. The second peak in October-November was mainly contributed by ring seine/purse seine. The ring seines had a clear domination over trawl net in Calicut.

TABLE 1. Percentage of gearwise mackerel catch in different centres

	Purse seine	Ring seine	Trawl	Gill net	Boat seine	Hooks & line
Karwar	99.33	0.00	0.66	0.00	0.00	0.00
Mangalore	86.01	2.13	8.82	2.44	0.00	0.00
Calicut	0.00	54.93	37.10	7.97	0.00	0.00
Cochin	34.98	15.17	48.29	1.56	0.00	0.00
Vizhinjam	0.00	0.00	0.00	84.67	0.00	15.30
Tuticorin	0.00	0.00	65.48	34.52	0.00	0.00
Madras	0.00	0.00	91.33	8.67	0.00	0.00
Visakhapatnam	0.00	0.00	35.31	55.34	9.35	0.00

In Cochin these two gear were almost equally important (Table 1). Thus, in this area mackerel is exploited by trawl net in summer and seine nets in post- monsoon period. The peak catches by the surface gear can be expected in any month from August to November. Annual variations are very common.

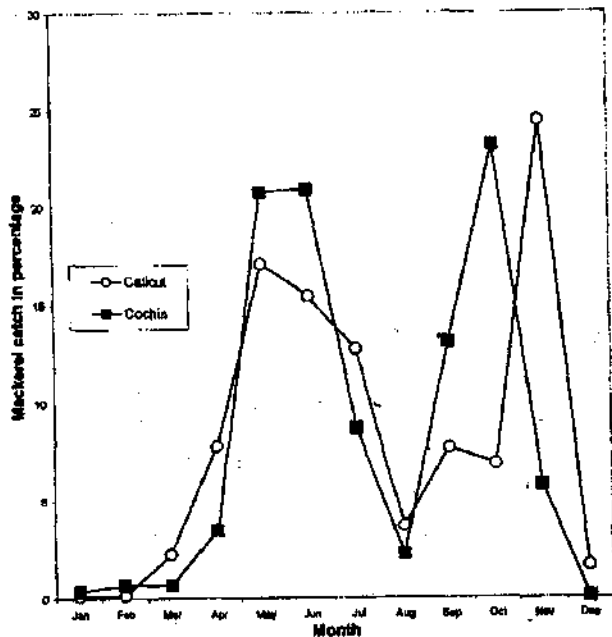


Fig. 2. Monthly percentage contribution to the total mackerel catch of Calicut and Cochin.

Peak catches in Vizhinjam and Tuticorin were made in June (Fig. 3) in spite of the fact that trawl, which is the dominant gear in Tuticorin is not operated in Vizhinjam, where gill nets are the dominant gear.

The peak in mackerel catch is not very

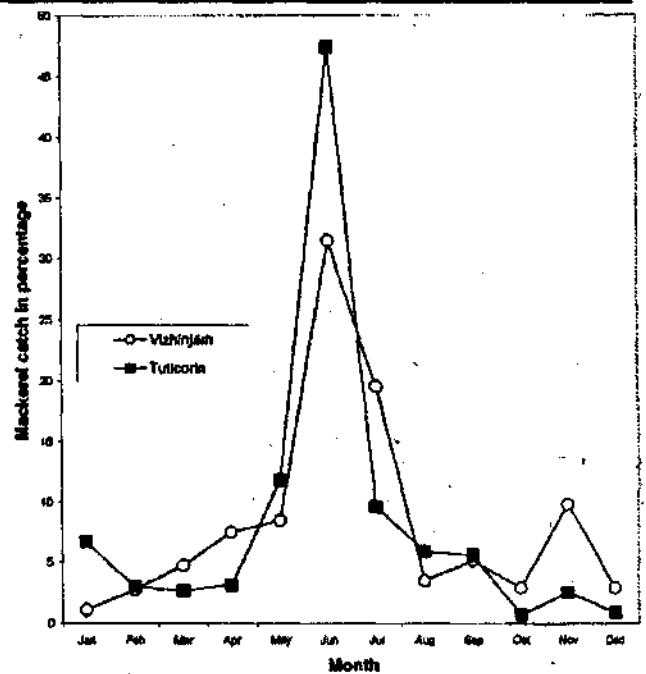


Fig. 3. Monthly percentage contribution to the total mackerel catch of Vizhinjam and Tuticorin.

prominent in Madras and Visakhapatnam (Fig. 4). However, there is a general increase in catch in February/March and secondary increase in July followed by a decline till November. Trend of this total mackerel catch was almost similar to that of the trawl catch, as the trawl was the major gear in the mackerel fishery here.

Trawls made almost 80% of the mackerel catch along the east coast. The contribution by trawls to the total mackerel catch along the west coast was only 10% in spite of good catches by these gear along the Calicut - Cochin area. Along the west coast mainly large seine nets exploit mackerel during the postmonsoon period (August-November). Increasing importance

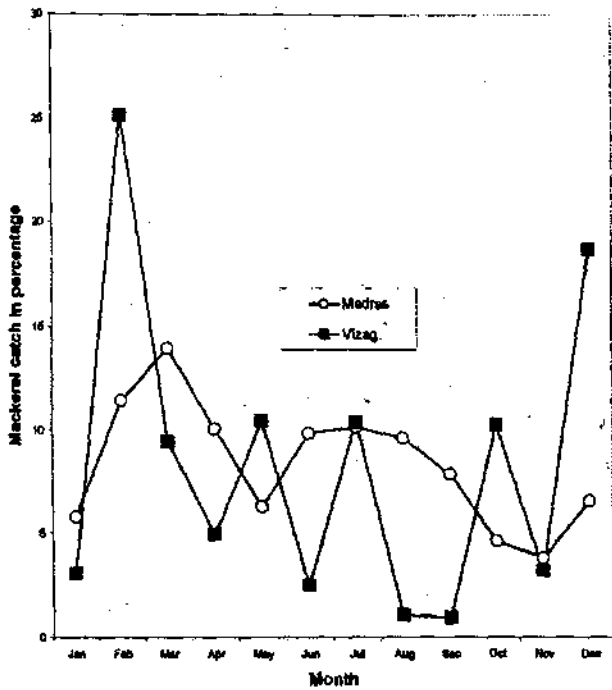


Fig. 4. Monthly percentage contribution to the total mackerel catch of Madras and Visakhapatnam.

of trawl nets in the mackerel fishery is a recent development. Trawling in an area of above 40m depth in summer only yield mackerel. Fig. 5 shows percentage of trawl catches along the west coast during different months (Data from

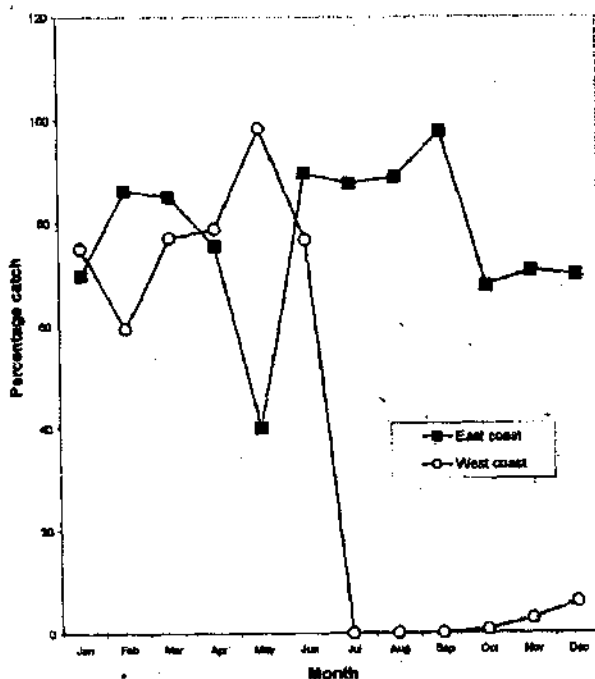


Fig. 5. Monthly percentage of mackerel catch by trawl in the total mackerel catch of east and west coasts of India.

Vizhinjam is excluded as the trawl or large seines are not operated here). It can be seen that there is a general increase in the percentage contribution from February to May/June. During July-September/October mackerel is not caught by trawl nets. Along the east coast the trend is entirely different. Trawl continues to be the major contributor to the mackerel catch throughout the year.

The importance of different gear in the mackerel fishery in different centres also shows a clear pattern (Table 2). Purse seines/ring seines are most important in Karwar; the northernmost centre along the west coast. The percentage contribution steadily decreases southward. In Vizhinjam, Tuticorin, Madras or Visakapatnam large seines are not operated.

The contribution by trawl net steadily increase from Karwar southwards along the west coast and northwards along the east coast (Fig. 6) except in Visakhapatnam where the contribution by gillnets is more than that of trawl. Trawl is not operated in Vizhinjam.

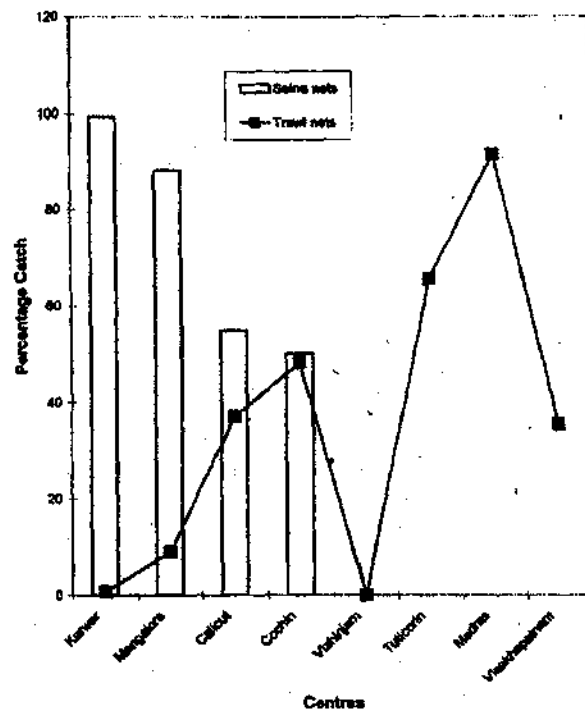


Fig. 6. Percentage of mackerel catch by trawl and seine nets in different centres.

TABLE 2. Mackerel catch by trawl as percentage of total catch in 1998

	Karwar	Mangalore	Calicut	Cochin	Tuticorin	Madras	Visakhapatnam
January	0.00	77.23	0.00	27.74	14.24	95.06	25.63
February	100.00	60.06	100.00	40.66	13.17	99.40	65.18
March	0.00	76.11	100.00	97.96	31.21	93.61	34.21
April	85.47	84.42	97.77	21.76	0.00	88.48	5.73
May	100.00	97.61	99.69	98.19	28.45	49.41	32.07
June	0.00	70.42	35.05	96.82	94.42	84.72	0.00
July	0.00	0.00	0.00	0.00	66.92	95.63	77.76
August	0.00	0.00	0.00	0.00	55.28	96.65	29.45
September	0.00	0.00	0.44	0.65	96.30	98.84	54.20
October	0.00	0.66	27.71	1.77	0.00	91.14	6.52
November	0.00	0.71	8.42	92.24	0.00	93.83	13.18
December	0.00	54.98	40.22	90.09	12.49	98.95	6.86
Total catch	0.66	8.82	37.10	48.29	65.48	91.33	35.31

Conclusions

The recent increase in the catch of mackerel from the deeper waters of the Calicut - Cochin area indicate that the fish move down to deeper areas during summer. Spreading of trawling to deeper waters, with the opening up of export market for cephalopods, can be the reason for the increased catch of mackerel by trawls. As the thermocline starts sinking and surface water temperature increases, the fish move down to deeper waters. But large shoal formation is not observed during this period. Large quantity is not caught by any trawler. Small quantities landed by large number of trawlers amount to a good total catch.

The increased catch by surface gear along the west coast during the postmonsoon period indicates the availability of the resources in the surface waters during the period. The surface fishery for the fish is active in the upwelling areas during peak upwelling and early sinking period. Perhaps it is the process of upwelling that pushes the resource to the surface waters. Mackerel stays above the thermocline. During upwelling, the mixed layer being very shallow the resources are forced to stay in the surface waters where they will be highly vulnerable to the surface gear. Plankton will be abundant in

this area as a result of upwelling. Mackerel form large shoals to feed on this plankton making surface fishery highly successful. Moreover, the most successful period of recruitment to the mackerel fishery coincides with upwelling which guarantees abundance of stock during the period. Along the east coast this phenomenon is not observed and surface fishery is not very successful. Trawling is more effective almost throughout the year.

Trawling in summer does not yield mackerel in Karwar and the catches are not very good in Mangalore also, though in both centres surface fishery during the postmonsoon period is highly successful. It is possible that when mackerel move down to deeper waters with the sinking of thermocline they move southwards.

Mackerel fishery along the west coast prior to 1980's was mainly by surface gear. The success of the fishery then mainly depended on the appearance of mackerel shoals in the surface waters. This in turn is controlled by the intensity of the upwelling, which is variable from year to year. Poor intensity can result in low catchability which in turn could have resulted in better abundance of the spawning stock and good recruitment in the following year. Intensity of upwelling increases catchability and can

result in a decline in spawning stock and recruitment. This can be one of the reasons for wide annual fluctuations in the catch of this resource.

Comparatively low catches of mackerel

from the east coast can be due to the absence of upwelling of the intensity sufficient to effect a plankton bloom and push the resource to the surface and form large shoals. Then possibly the resource available in the deeper waters can be of high order.