Bull. Cent. Mar. Fish. Res. Inst., 1992, 45 : 85 - 91

PRESENT STATUS OF EXPLOITATION OF FISH AND SHELLFISH RESOURCES : INDIAN MACKEREL

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ABSTRACT

The Indian mackerel *Rastrelliger kanagurta* contributes to 3% of the total mackerel catch of the west coast during the monsoon period. The catch trend at important centres *viz.* Vizhinjam, Cochin, Calicut, Mangalore, Karwar and Goa and the biological aspects such as length composition, maturation during monsoon, premonsoon and postmonsoon seasons are dealt with. In the light of the information available at present, it is suggested that a reduction in the fishing effort on mackerel stock along the west coast in the later half of the premonsoon and during monsoon may help to replenish the populations for sustained exploitation of the resources.

INTRODUCTION

The Indian mackerel *Rastrelliger kanagurta* is one of the important pelagic resources exploited along the west coast of India. Wide fluctuations in its landings from year to year are well known. During 1979-88 the total annual catch of mackerel along the west coast fluctuated from 15,503 tonnes in 1983 to 80,375 t in 1988 (Fig. 1). Monsoon and related changes in environment are found to influence its availability in the fishing area (Pradhan and Reddy, 1962; Noble, 1972; Rao *et al.*, 1973; Yohannan and Balasubramanian, 1991). An attempt is made here to study its fluctuations in space and time in relation to monsoon months giving suggestions on methods to improve the catch.

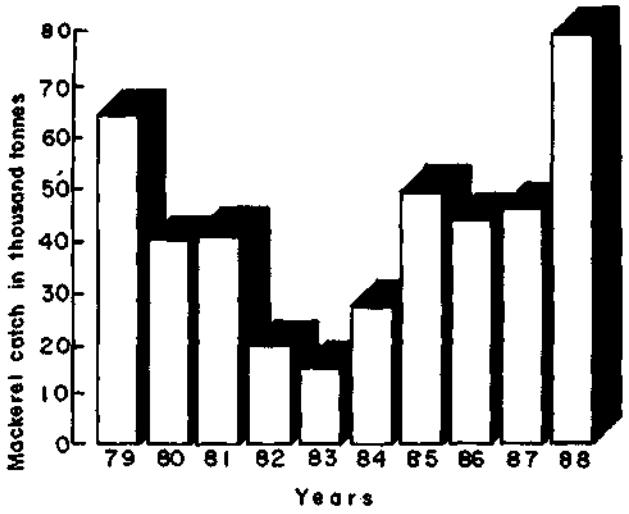

Fig. 1. Mackerel catch along the west coast of India.

DATA BASE

Data on the fishery and biology of the Indian mackerel from Vizhinjam, Cochin, Calicut, Mangalore and Karwar from February 1984 to August 1988 and from Goa from February 1984 to January 1988 form the basis of this study. Data during an year is pooled for the periods, premonsoon (February-May), monsoon (June-August) and postmonsoon (September-January). As the durations of these periods are unequal, average monthly estimate of each period is taken for comparison.

OBSERVATIONS

Fishery

Figure 2. gives the average total mackerel catch for each period at different centres. At all centres, peak catches are recorded during the postmonsoon period except at Vizhinjam where the catches are observed to be relatively high in the premonsoon period. The average seasonal catch, effort and catch per unit of effort (CPUE) at different centres are given in Figs. 3 - 6. It is seen that the bulk of the mackerel catch at Cochin, Mangalore, Karwar and Goa is realised by the purse seine. Only at Vizhinjam and Calicut, where purse seines operations are not available the fishery continues to be artisanal. But here also motorisation of indigenous crafts over the years has resulted in the mechanisation of all the country crafts at Calicut (Yohannan and Balasubramanian, 1991) and 85% of the drift net units and 80% of the hooks and line units at Vizhinjam (Gopakumar *et al.*, 1986).

The fishery is found to be most active in the postmonsoon period especially where the purse seines are in operation. Relatively high catches of mackerel are observed at the centres as compared to those in the centres where this gear is not in operation. The catch in general is the lowest during the monsoon period (Fig. 2) except at Calicut and Goa where the monsoon catches are higher than that of the premonsoon period.

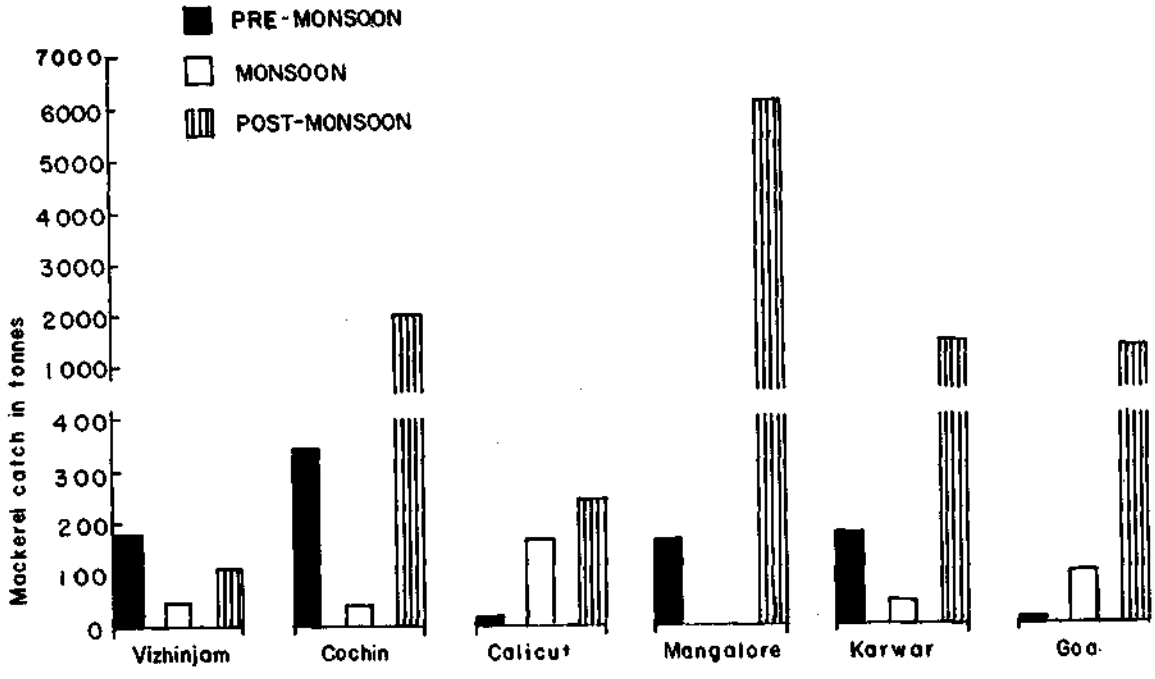

Fig. 2. Average total mackerel catch in different seasons during February 1984 - August 1988.

At Vizhinjam (Fig. 3) the catches in drift nets, particularly those operated onboard the motorised crafts, were high. In both drift net and hooks and line, whether mechanised or not, the CPUE during monsoon period was the highest in 1987-88. During other years, it was highest in premonsoon period. *Chala vala*, boat seines and shore seines also landed mackerel in small quantities apart from the drift nets and hooks and line.

At Cochin (Fig. 4) where purse seines contribute to the bulk of the mackerel catch, the peak landings were in the postmonsoon period. Purse seines suspend operations in monsoon months. Fishing activity was high also during premonsoon period when appreciable quantities of mackerel were caught. Trawl nets and drift nets also landed mackerel here as by-catches. In 1987-88 and 1988 mackerel catches by trawl nets increased considerably. Drift nets used to get better CPUE during the monsoon period. The average monthly CPUE during different periods in the years reviewed ranged between 1.26 and 2.36 kg in drift net and from 1.76 to 7.32 kg in trawl net. While the maximum effort and relatively high catch of mackerel were observed in the drift nets during the monsoon of 1988, they were better in the trawl nets operated during the premonsoon period.

At Calicut (Fig. 5) *patten kolli* (boat seine) and *ayila chala vala* (gill net) were the important gear employed in the mackerel fishery. Peak catches were observed during the postmonsoon period in the *patten kolli vala* (1988). But catches were high in the monsoon period and poor during premonsoon period. In 1987-88, however, all the gears landed appreciable catch of mackerel during the monsoon period. A small type of boat seine, namely *nethal vala* also landed mackerel in good quantities during the monsoon periods. Drift nets, *mathi chala vala* and trawl nets too landed mackerel as by-catches. The effort, catch and catch rate of *ayila chala vala* and *nethal vala* were generally higher during monsoon.

At Mangalore (Fig. 6) purse seine was the gear used in the mackerel fishery with peak landings occurring during the postmonsoon period. The gear was not operated during monsoon. The

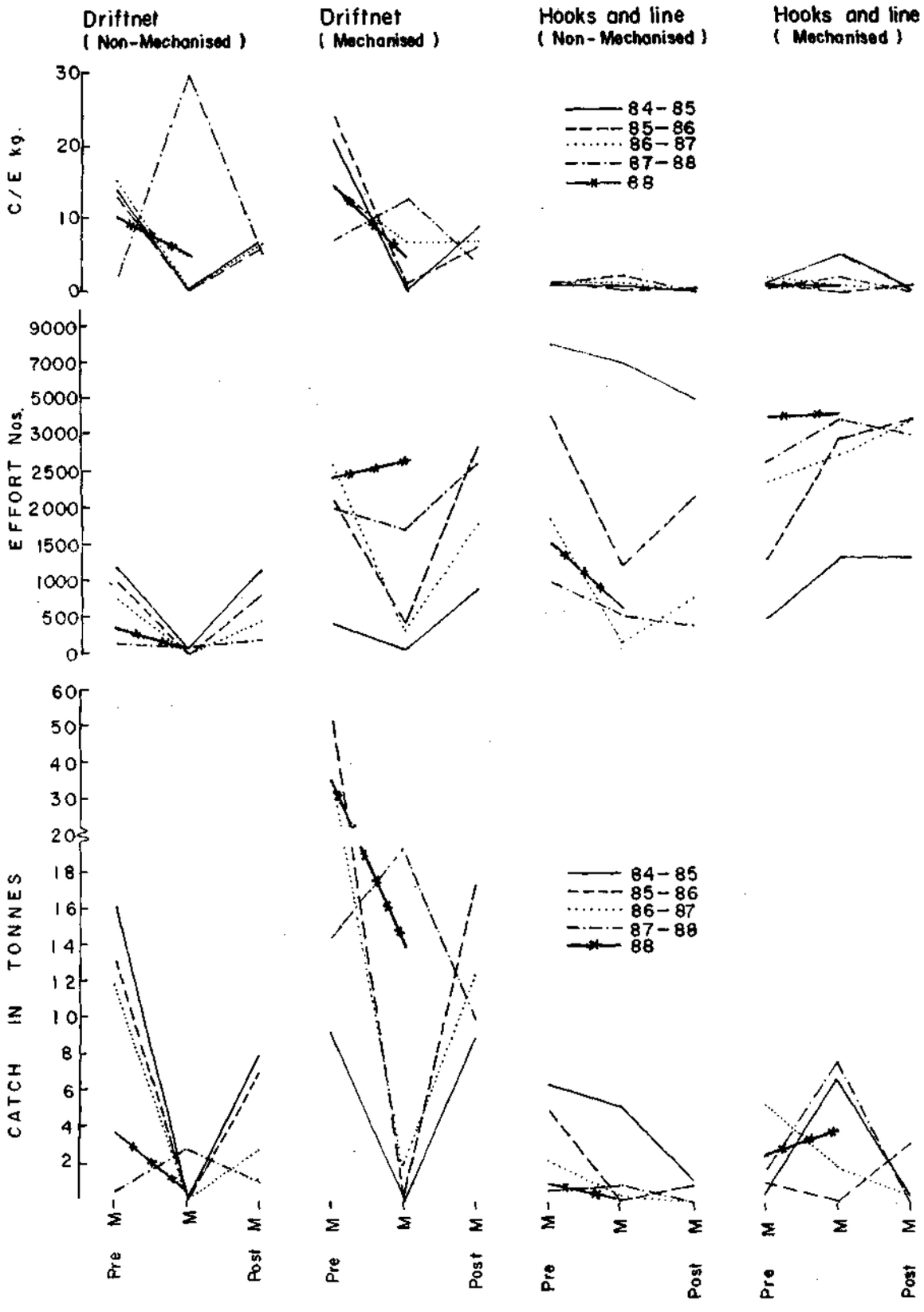

Fig. 3. Average seasonal catch, effort and catch per effort at Vizhinjam during 1984 -'88.

catches were poor during the premonsoon period when compared to the heavy catches recorded during the postmonsoon period. But the quantities landed regularly during this period were appreciably higher than that landed during the same period at other centres. Trawl nets also landed mackerel here in small quantities.

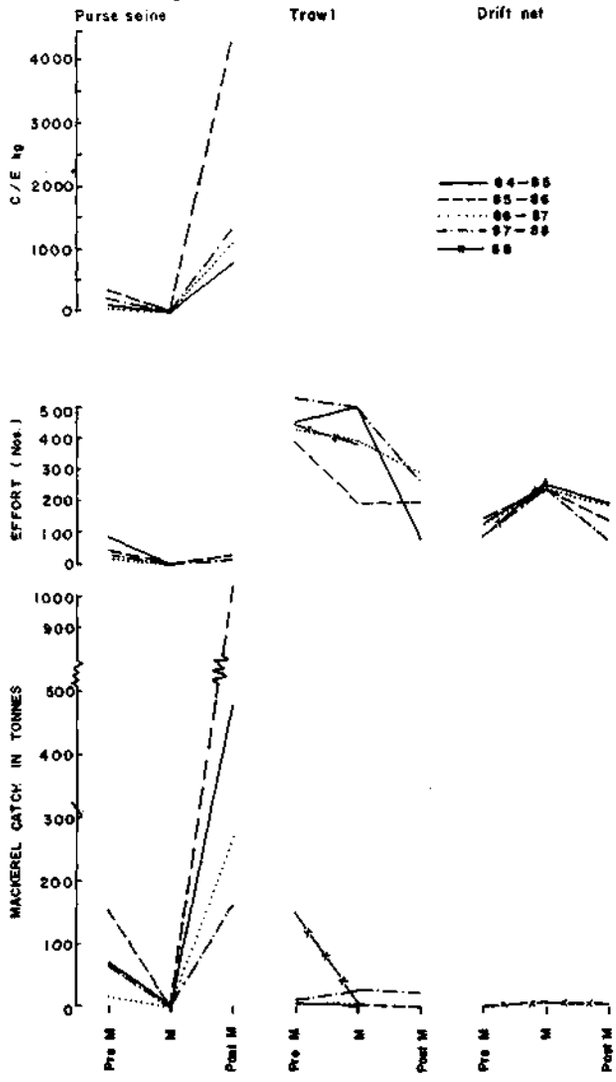

Fig. 4. Average seasonal catch, effort and catch per effort at Cochin during 1984 -'88.

At Karwar (Fig. 6) also, the purse seines landed major portion of the mackerel catch. Peak catches were made during the postmonsoon period when fishing activity was intense. But some purse seining activity was observed here in the monsoon period also. Though the activity was at the minimum, the catch rates were high during this period. In the first 3 years, maximum CPUE was obtained during monsoon period. The catch rates were generally poor during the premonsoon period. Small quantities of mackerel catch were obtained by *yendi* (small shore seine) and *rampan* (large shore seine). *Rampan* which had almost disappeared from the scene reappeared in the postmonsoon period of 1987-88 catching 4 t in 3 operations.

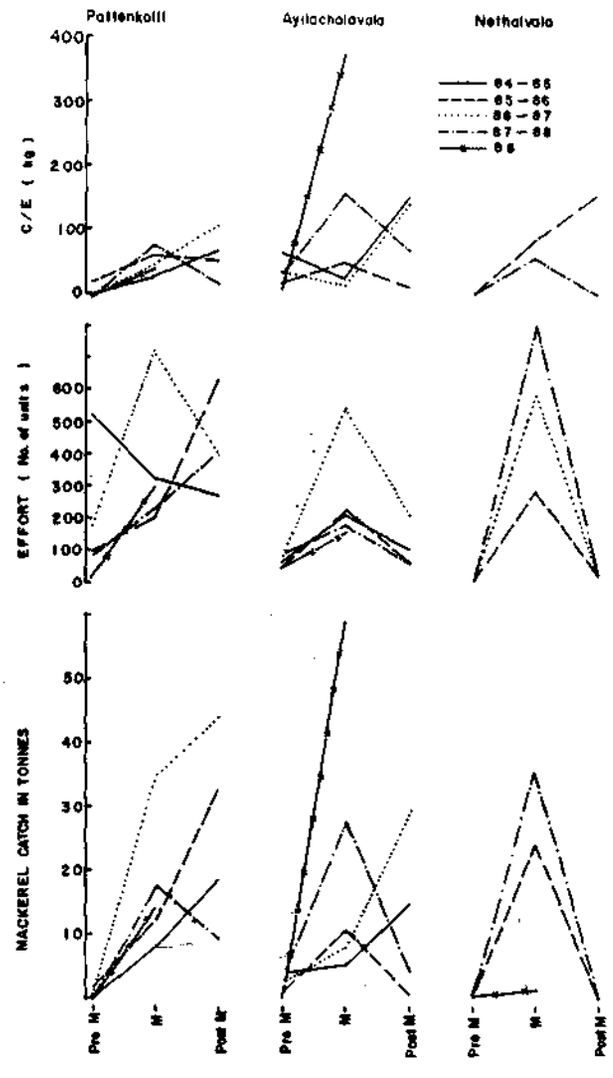

Fig. 5. Average seasonal catch, effort and catch per effort at Calicut during 1984 -'88.

At Goa (Fig. 6) only purse seines were operated during 1984-88. The fishing activity was lowest during the monsoon period and highest during postmonsoon period. But, catch rates were very poor during premonsoon period. Peak CPUE was obtained during the monsoon periods of 1984-85 and 86-87 and during the postmonsoon periods in 1985-86 and 87-88. The landings were invariably maximum during postmonsoon periods.

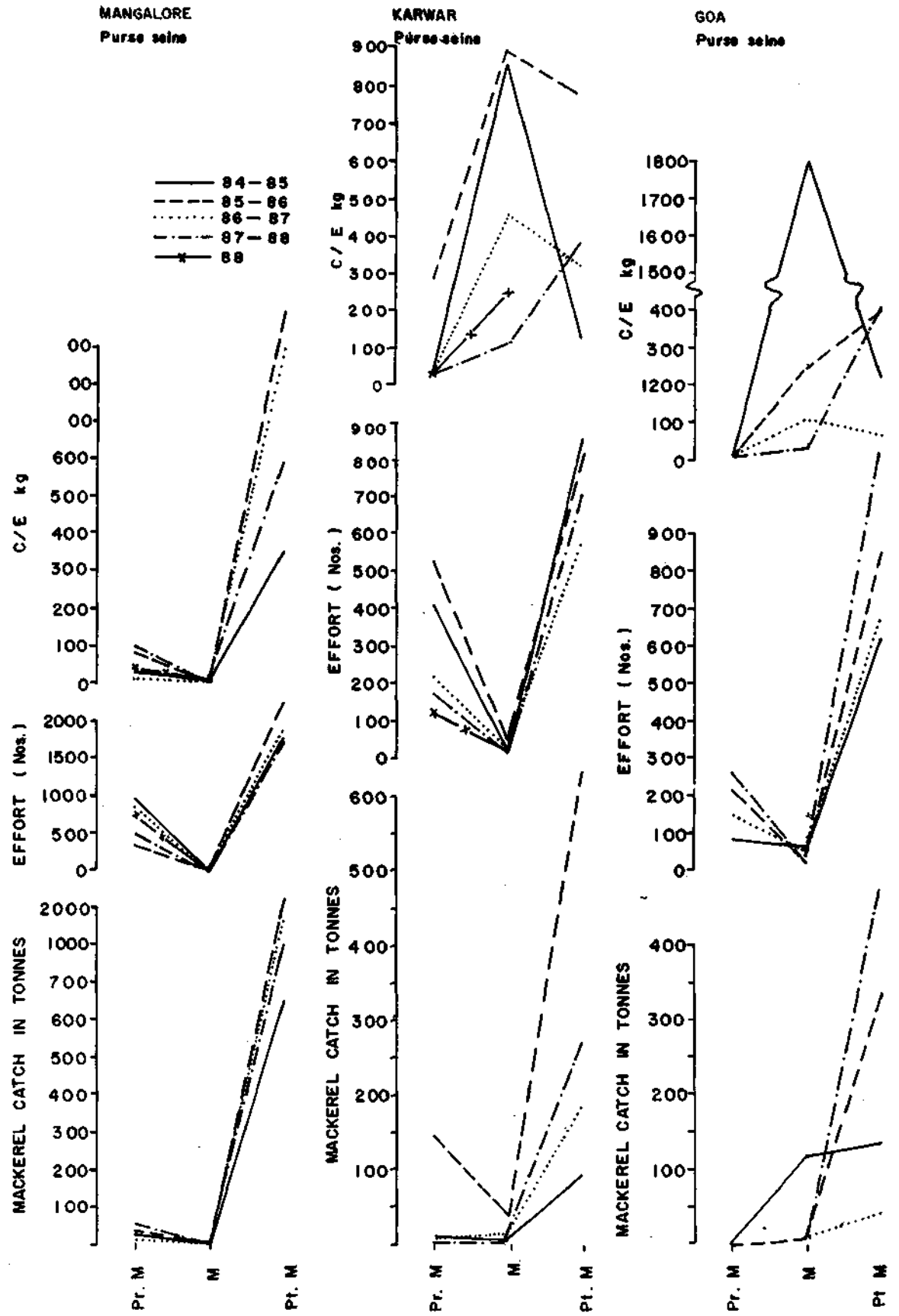

Fig. 6. Average seasonal catch, effort and catch per effort at Mangalore, Karwar and Goa during 1984 -'88.

Biology

Length composition : Figure 7 gives the size distribution of mackerel during different seasons at different centres. During the premonsoon seasons the dominant size groups were from 210 to 270 mm at all centres except Mangalore where it was 110 - 140 mm. Such small sizes formed a very minor peak at Calicut and Goa.

During the monsoon period, at Vizhinjam and Calicut, smaller fishes measuring from 70 to 110 mm dominated the catches. At Goa, fishes of 130-150 mm length range dominated. At Karwar the dominant size group was between 160 and 180 mm. Minor peaks at 240 mm at Vizhinjam, 220 mm at Calicut and Goa and 230 mm at Karwar were also noticed.

The size groups from 160 to 240 mm dominated the catches during the postmonsoon season at all the centres. The mode was at 220 mm at Vizhinjam and Cochin. At Calicut the distribution was bimodal with a primary mode at 170 mm and a secondary one at 200 mm. At Mangalore the dominant mode was at 200 mm and the next one at 230 mm. At Karwar and Goa also the mode at 200 mm dominated. At Goa another prominant mode was observed at 100 mm.

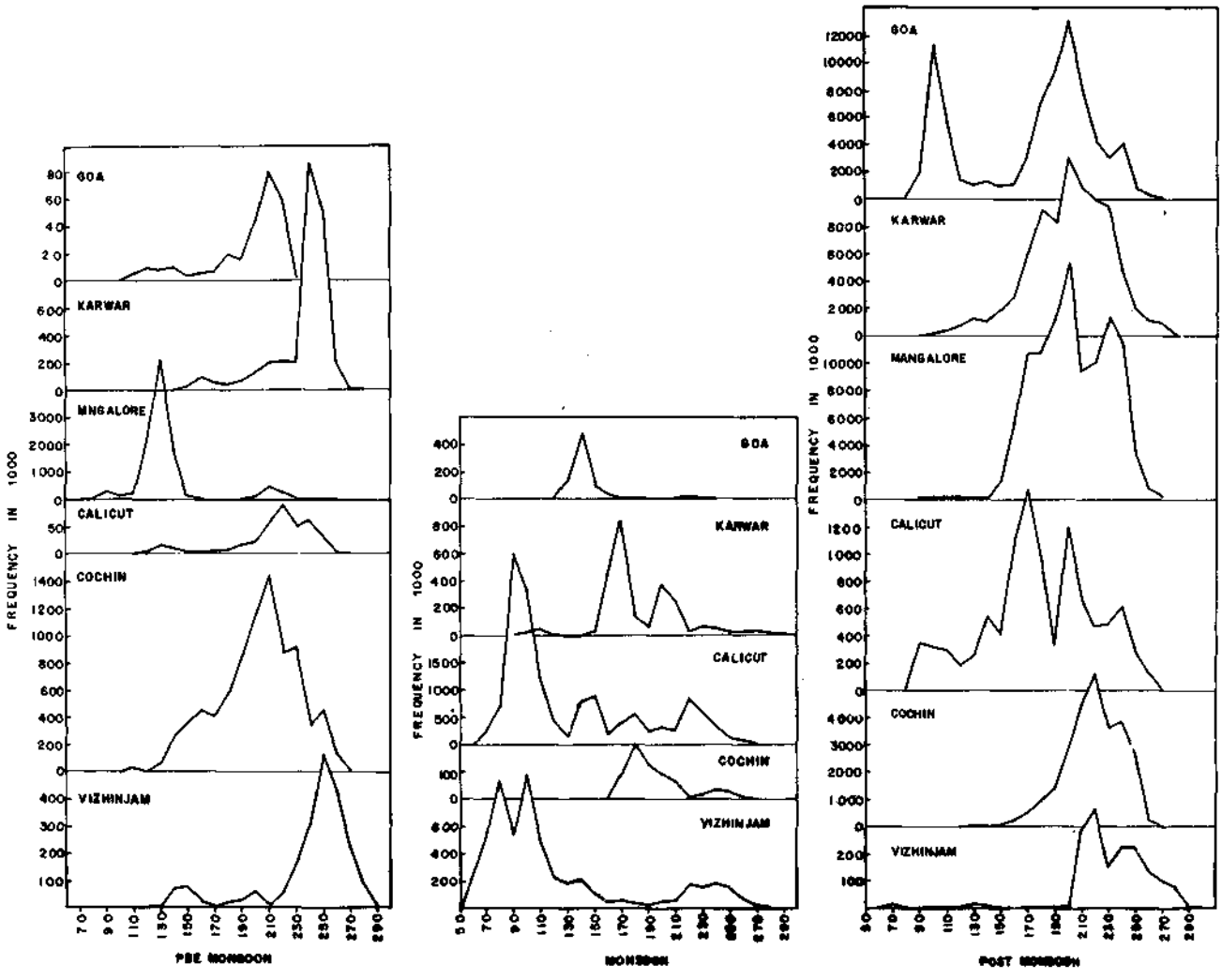

Fig. 7. Length Frequency distribution of mackerel during different seasons at different centres.

In general, large size groups dominated the fishery during premonsoon period. Juveniles were the mainstay of the monsoon fishery. Medium, commercial size groups formed the bulk of the catches during postmonsoon period.

Maturation

Figure 8 illustrates the percentage of mature mackerel during different months at Vizhinjam and Calicut. Maximum percentage of mature mackerel were observed from March to July with a peak in May. At Vizhinjam a secondary peak was observed in October indicating another spawning period of minor importance.

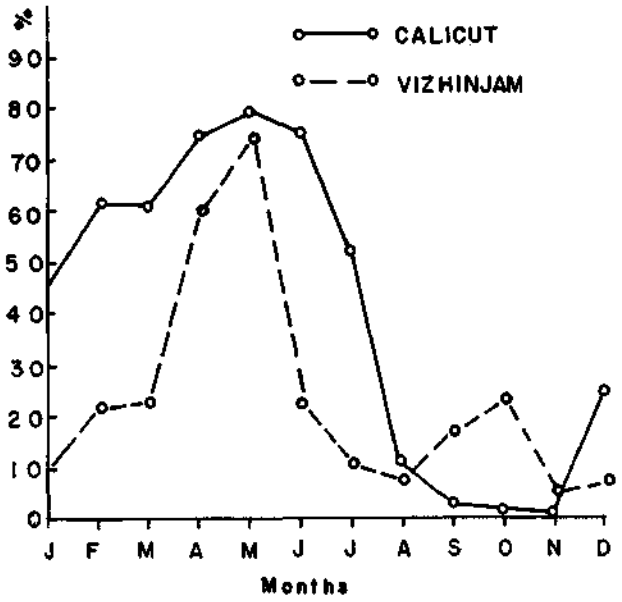

Fig. 8. Percentage of mature mackerel at Vizhinjam and Calicut.

Discussion

On the whole around 90% of the mackerel catch was made in the postmonsoon period, 7% in the premonsoon period and 3% in the monsoon period.

The reason for the low catches during the monsoon period was generally due to decreased effort. Besides, the adverse sea conditions also restricted the fishing units from operation. But during certain years, peak catch per unit of effort was recorded in the monsoon period from different centres. In 1987-88 peak CPUE was recorded in this season at Vizhinjam and Calicut. In 1984-85, 1985-86 and 1986-87 Karwar recorded maximum CPUE during this season. In 1988 also it was high. Goa recorded maximum CPUE during monsoon in 1984-85. With the use of outboard engines for propulsion of country crafts there was a steady increase in effort during the monsoon season at Vizhinjam and Calicut (Fig. 3 and 5). But this is a situation which has to be watched cautiously. Fig. 7 and 8 indicate that in the beginning of monsoon season the fishing is on the spawning stock and subsequently switching over to capture of juveniles of non-commercial importance in large numbers. The figures further indicate intensive spawning to take place around May and large scale removal of its products in the succeeding monsoon season lead to growth overfishing. Fig. 7 and 8 further indicate that during pre-monsoon the fishing pressure is on the mature and spawning mackerel that continues into the early part of the monsoon period. There is an active premonsoon fishery at all centres except Calicut and Goa. At Vizhinjam, peak catches are obtained during the premonsoon period. At Cochin though the peak catches are made during the postmonsoon period, its premonsoon catches exceed the corresponding catches at Vizhinjam. The catches by trawl nets at Cochin are on the increase during the premonsoon period. Yohannan and Balasubramanian (1991) have found a relation between spawning stock and subsequent mackerel fishery.

In the light of the above observations it may be suggested that a reduction in the fishing pressure on mackerel stocks along the west coast in the later half of the premonsoon and during monsoon may help to replenish the mackerel population and subsequent recruitment to the fishery in the postmonsoon season.

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