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PRESENT STATUS OF EXPLOITATION OF FISH AND SHELLFISH RESOURCES : THREADFIN BREAMS

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ABSTRACT

Threadfin breams, an important demersal fishery resource along the Indian west coast, are mainly exploited by small commercial trawlers in depths upto about 50 m. These fishes are more abundant in relatively deeper waters beyond 50 m and are known to move into shallower areas during monsoon period along southwest coast. Along Kerala Coast, maximum catches and catch rates are obtained during monsoon period. There is no significant trawling along Maharashtra and practically no trawling along Karnataka and Gujarat Coasts during monsoon period. Two species viz. *Nemipterus japonicus* and *N. mesoprion*, contribute to the fishery and along Kerala Coast, the latter species is the principal one during monsoon period and the former in other period. Along the coasts of other States in the west coast, the principal species is *N. japonicus* in all seasons. Fishes of larger lengths are caught in monsoon period and of smaller lengths in postmonsoon period at Cochin. At Bombay, the average length is highest during the postmonsoon and lowest during monsoon in *N. japonicus*. Nemipterids spawn over longer periods and in *N. japonicus* peak spawning takes place during monsoon at Cochin and Bombay, during postmonsoon at Veraval and partly during post and pre-monsoon periods at Mangalore. In *N. mesoprion*, peak spawning takes place during postmonsoon period at Cochin and Veraval and during monsoon period at Bombay.

The available information and data on distribution during different seasons, on various aspects of biology and on present exploitation of stocks of threadfin breams along the west coast are considered for a detailed discussion and suggestions on different management options are given.

INTRODUCTION

The fishes of the Family Nemipteridae, popularly called Threadfin breams (*Kilimeen* in Malayalam, *Madhumal meenu* in Kannada, Rani in Marathi, *Lal machala* in Gujarati) form an important component in the exploited demersal fishery resources of India. An estimated 67,677 tonnes of these fishes were landed in 1989 (CMFRI,1989; Anon., 1990) from Indian Seas, which formed 7.7% of total demersal fish landed and 3.0% of total marine fish landings of India. Though they are presently exploited in depths of about 50 m and less by the small commercial shrimp trawlers, the threadfin breams are more abundant in 75-100 m depth along the Indian west Coast (Silas, 1969) and in the depth range of 50-125 m in the north eastern Arabian Sea (Zupanovic and Mohiuddin, 1973). According to James *et al.* (1987), the threadfin breams constitute a promising resource having good potential for exploitation along both the coasts; according to them, further, large concentrations of these fishes are located in 75-225 m depth zone during February-May and in comparatively shallower waters during July-September. There are wide seasonal fluctuations in abundance of threadfin breams particularly in the trawling grounds of the eastern Arabian Sea. Along the southwest coast of India, in the trawling grounds off Sakthikulangara and Cochin, very heavy catchs are obtained during the monsoon months of June-August, the catches during this period accounting for over 80% by weight of total annual threadfin bream landings at these centres. For various reasons such as conflicts between the fishermen of artisanal gear and trawlers, apprehensions of over-fishing of spawners and destruction of spawns, particularly of some important pelagic fishes, caused by mechanised fishing during monsoon months and safety of fishermen, some States on the west coast of India have prohibited mechanised fishing during monsoon months. This has led to a great deal of resentment among trawler operators and exporters. According to them "the ban will not produce better catches after the ban period, but the stoppage of trawling will affect the future catches

also" (Anon., 1989). This being the background, it is considered desirable to critically examine the data on fishery and biology of dominant species of threadfin breams obtained from different centres along the Indian west coast to enable giving a suitable advice on whether a ban on mechanised fishing during monsoon season is necessary or not from the biological point of view.

Data Base

Bulk of the threadfin bream catch in India is obtained by trawlers and therefore the present study is based on data collected from trawler landings. Data on monthly effort (number of operations of boats), catch, species composition and biology of important species of threadfin breams from trawl landing centres at Cochin, Mangalore, Bombay and Veraval collected from February 1984 to August 1988 are utilised for the study. At Vizhinjam, small quantities of threadfin breams are landed by hooks and lines; the data from this centre however, are also included in the present study. Data on estimated quarterly effort and catch from six trawl landing centres along the west coast pertaining to the period January 1982-June 1988 are also examined. For the purpose of the present study, a year is considered under three periods; premonsoon period from February to May, monsoon from June to August and postmonsoon period from September to January.

Observations

Annual landings of threadfin breams at different centers : The estimated landings of threadfin breams at different centres (Table 1) during 1982-'87 show fluctuations over the period and maximum landings are obtained from the centres of Kerala Coast followed by those of Maharashtra, Gujarat and Karnataka. Excepting Vizhinjam, the landings from all centres are obtained by trawlers only. At Vizhinjam there is no trawling and threadfin breams are caught by Hooks and lines (used by motorised as well as nonmotorised crafts). It is interesting to note that though there is considerable effort of hooks and lines, during this period at Sakthikulangara, Cochin and Sassoon Docks, there is no catch of threadfin breams by this gear.

Quarterly estimated effort and catch : The data obtained from six centres along the west coast show : (a) At Sakthikulangara in Kerala (Fig. 1 A) the trawling effort and threadfin bream catch, are highest during third quarter (July-September) in all years. The catch and the effort during this quarter in different years form 81-85% and 29-38% of total threadfin bream catch and total trawling effort respectively in each year. Further, the nemipterid catch in the third quarter in different years shows increasing trend in succeeding years upto 1986 though similar trend is not there in effort. (b) At Cochin, also in Kerala (Fig. 1 B), the effort is maximum is second quarter (April-June); it forms 34-42% of annual effort in different years whereas the catch of nemipterids is the highest in third quarter (July-September) forming 70-86% of annual threadfin bream catch in each year. In 1985 however, the catch in second and third quarters is the same. (c) At Mangalore in Karnataka (Fig. 1 C), the effort is highest in first quarter (January-March) forming 42-55% of total annual effort in each year; it is lowest in third quarter (July-September) forming 0.2-2.4% of total annual effort in each year. The catch of threadfin breams is highest in first quarter (46- 65% of total annual catch) in 1984, 1986, 1987 and 1988 and in second quarter (April-June) (49-53 % of total annual catch) in 1983 and 1985. (d) At the New Ferry Wharf landing centre (Fig. 1 D) in Maharashtra (Bombay) the effort is maximum in fourth quarter (October-December) and minimum in third quarter, forming respectively 32-40% and 9-18% of the annual effort in different years. The nemipterid catch is highest in fourth quarter (conforming to effort) in 1982, 1984 and1986 forming 40-56% of total annual catch and in second

Table 1. *Estimated landings (tonnes) of threadfin breams at different centers along the west coast during different years*

Centre	1982	1983	1984	1985	1986	1987	Annual Average
Vizhinjam	-	-	118	210	264	350	235
Sakthi-kulangara	4830	5529	14256	20904	28668	14507	14782
Cochin	3505	1016	5222	1968	7076	4576	3894
Mangalore	-	1462	518	330	1881	2664	1371
Bombay							
New Ferry wharf	409	2150	1308	653	1262	1436	1203
Sassoon Docks	3287	2125	1687	1591	2580	2942	2369
Veraval	998	1015	2085	1739	4571	1015	1904

quarter forming 32-42% of total annual catch in 1983, 1985 and 1987. (e) At another centre in Maharashtra (Sassoon Docks at Bombay) (Fig. 1 E) the effort is highest (27-29% of annual effort) in fourth quarter in four years (1983, 1984, 1986 and 1987), first quarter in one year (1982) and in third quarter in yet another year (1985). The effort is minimum in second quarter (17-25% of annual effort) in all years; the catch, however, is highest in second quarter in all years excepting one (1984) when the same is highest in fourth quarter. (f) At Veraval in Gujarat (Fig. 1 F), the effort is minimum

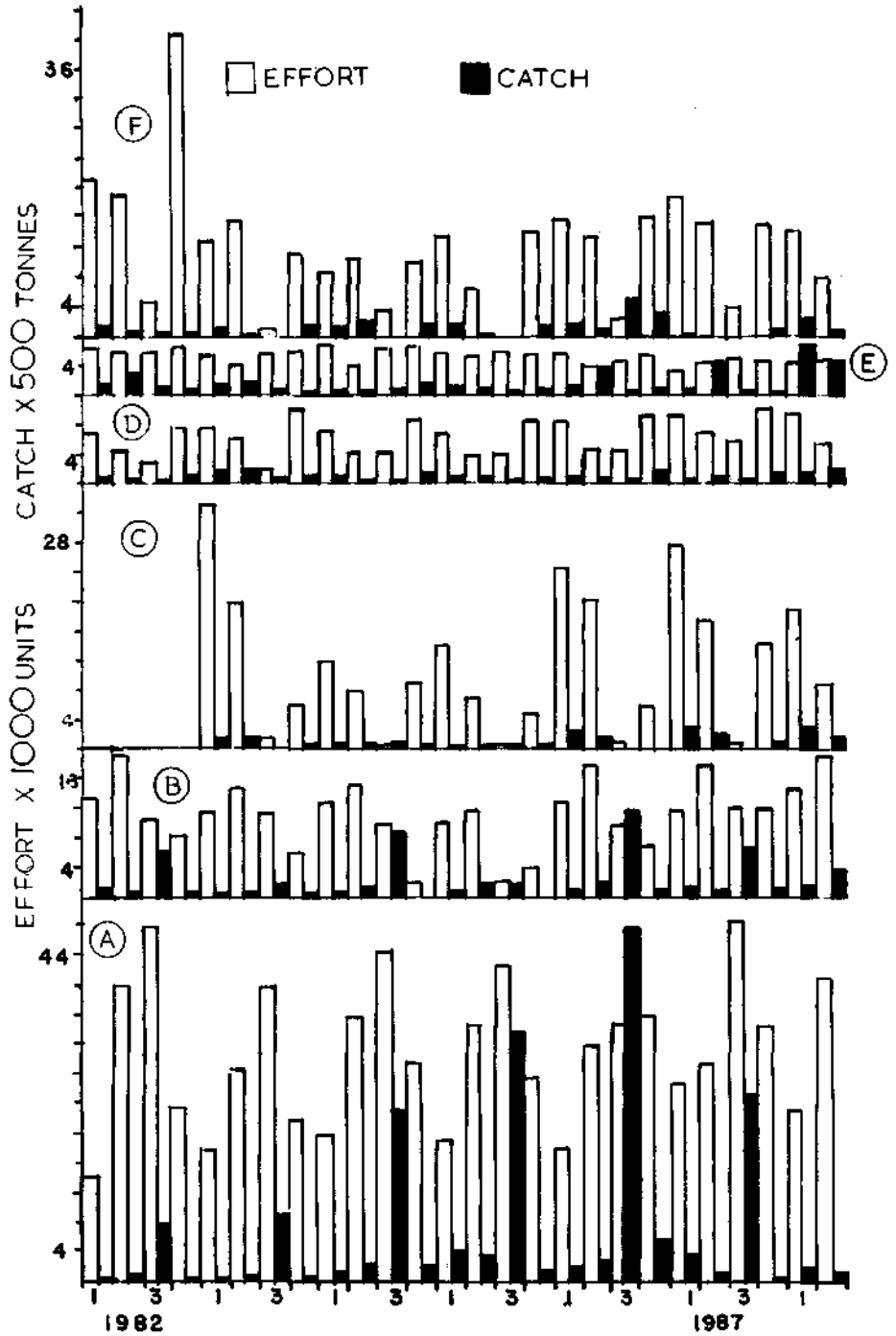

Fig. 1. Quarterly estimated effort and threadfin bream catch in different years at important trawl landing centres along the west coast of India. A. Sakthikulangara, B. Cochin, C. Mangalore, D. New Ferry Wharf, E. Sassoon Docks and F. Veraval.

in third quarter in all years forming 1-10% of the total annual effort in different years. In some years there is no fishing in third quarter and there are no landings of threadfin breams in third quarter of some other years. The peak period of catch is different in different years.

Along the west coast the monsoon period is June-August and 67% of this period falls under third quarter and 33% in second quarter in the quarterly effort and catch data mentioned above.

and March, July August 1988. Peak catches, however, are obtained (Fig. 2) in August-September 1984, July-September 1985, June-August 1986 and June-September 1987. Thus, though there are year to year variations in peak periods of effort and catch, the peaks in both of them in July-August are more or less consistent.

At Cochin (Fig. 3), maximum landings of threadfin breams are obtained during June, July or August in different years. The trawling is either

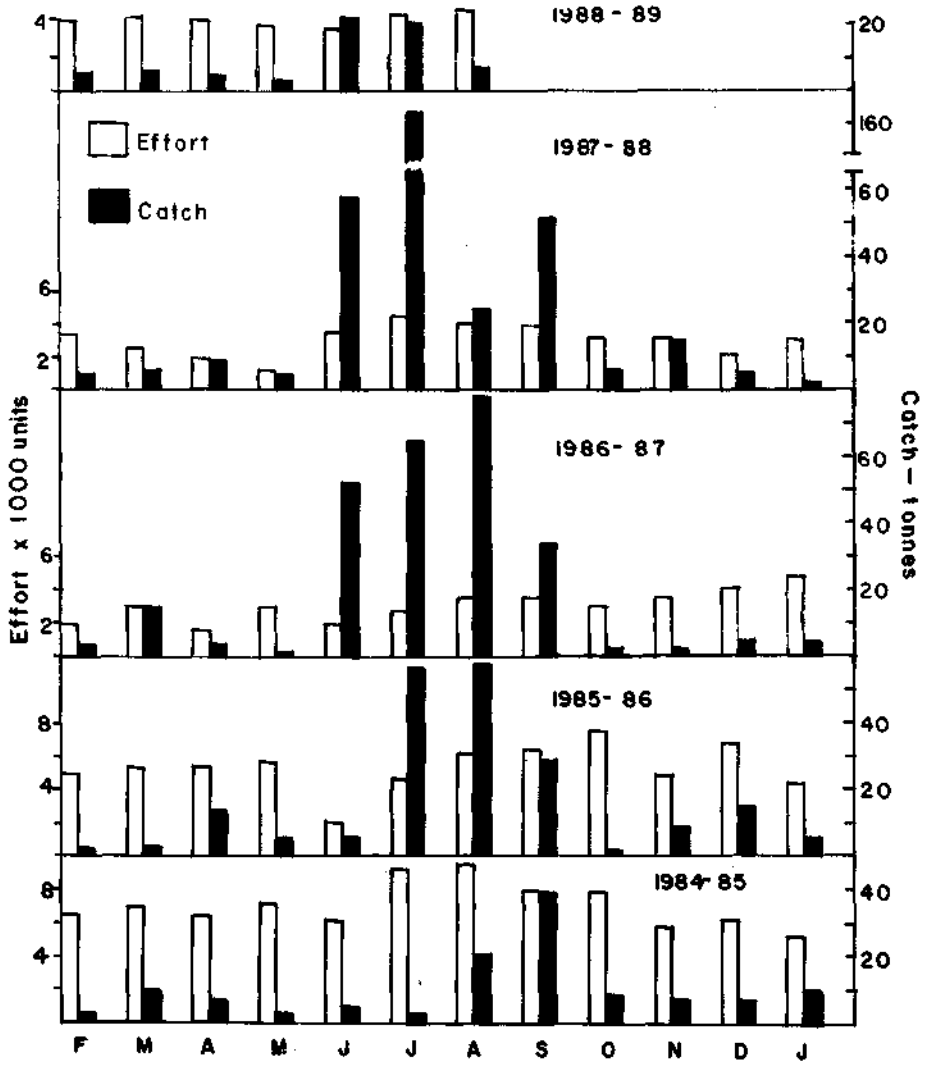

Fig. 2. Monthly estimated effort and catch of threadfin breams by hooks and lines at Vizhinjam during different years.

Monthly effort and catch at selected centers : At Vizhinjam, hooks and lines contribute to over 95% of threadfin bream landings and this gear is in operation round the year. Maximum effort is expended (Fig. 2) in July-August 1984, October 1985, December 1986, January, July, August 1987 very poor or absent during September-October. Though there is considerable trawling effort in November and December there is either no catch or the catch of nemipterids is very poor.

At Mangalore, there is no trawling during June-August period; there are no landings or poor

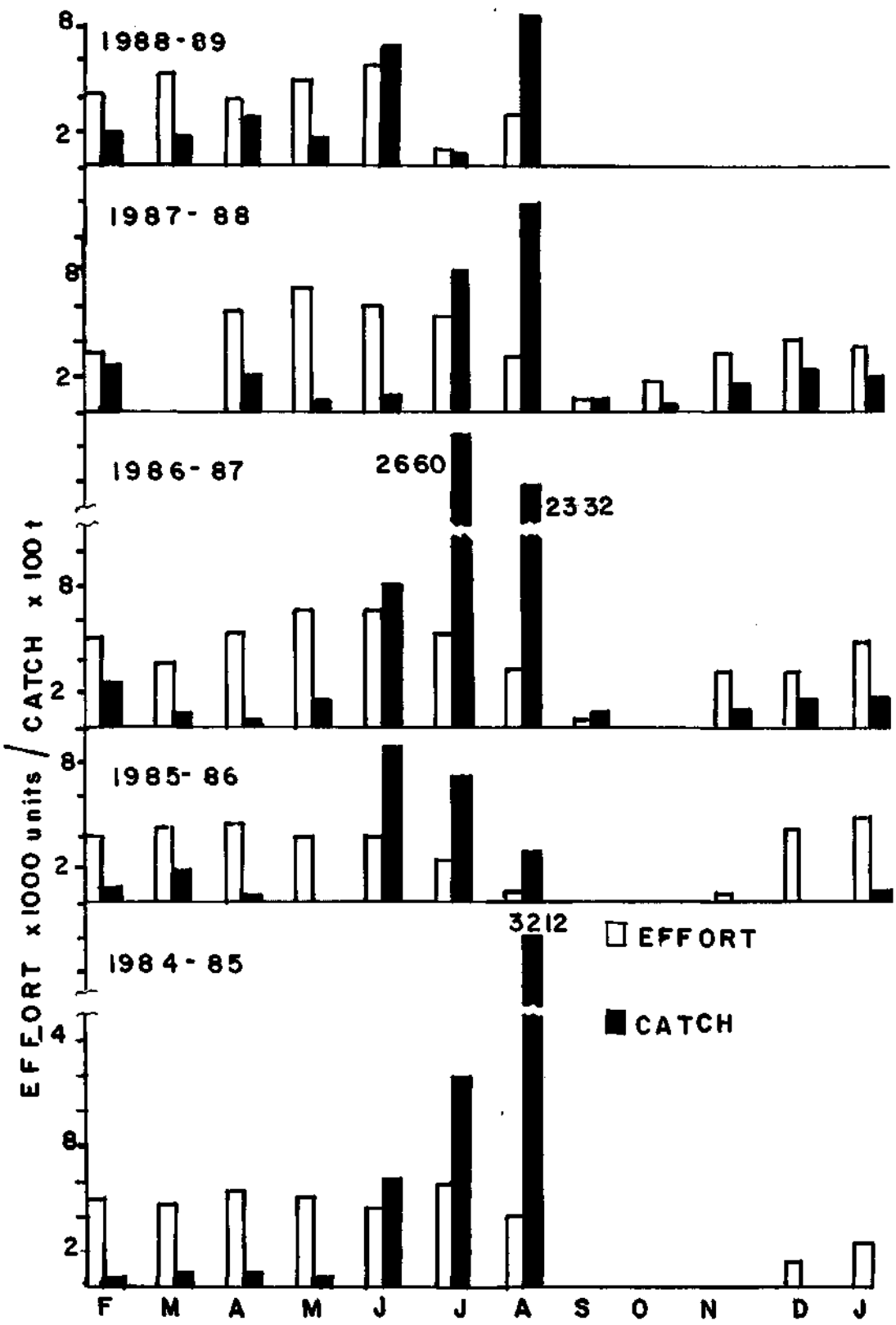

Fig. 3. Monthly estimated effort and catch of threadfin breams by trawlers at Cochin during different years.

landings during September and October and maximum catch of over 400 t is obtained in March and May.

At New Ferry wharf landing centre in Bombay (Fig. 4), the trawling effort and catch of nemipterids are very poor from June to August. Consistently good catches are obtained in October and in some years the catches are maximum in April. The effort is generally at its peak during September-December period.

At Veraval (Fig. 5), there is no trawling during June-August. Though the months of peak effort and catch are different in different years, generally the catch and effort are good during March, September and October.

breams is obtained in monsoon period of all years except 1984-'85 when the peak catch is obtained in postmonsoon period (Fig. 6). At Cochin (Fig. 7 A) the average effort is highest during premonsoon and lowest during postmonsoon except during 1985-86. The nemipterid catch, however, is the highest during monsoon forming 71-97% of total nemipterid catch obtained in each year. At Mangalore (Fig. 7 B) both the effort and catch are highest in premonsoon period and there is no fishing during monsoon. At Bombay (Fig. 7 C), the effort and catch are minimum during monsoon and maximum during postmonsoon. At Veraval (Fig. 7 D) there is no fishing in monsoon period and the effort as well as catch are higher in premonsoon in some years and in postmonsoon period in some other years.

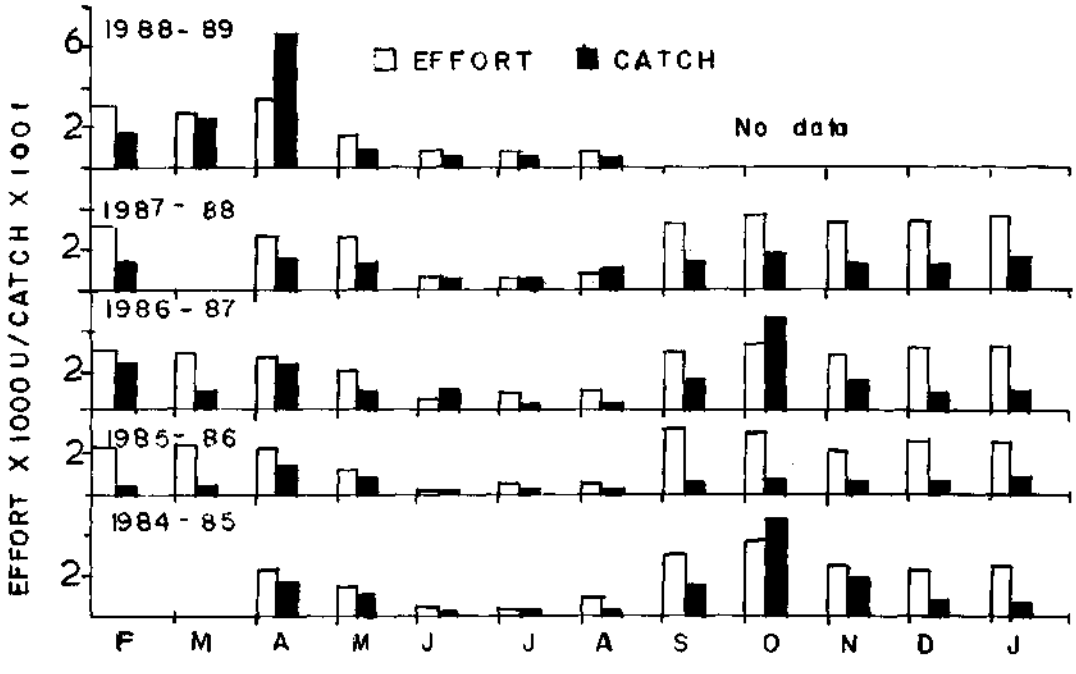

Fig. 4. Monthly estimated effort and catch of threadfin breams by trawlers at New Ferry Wharf (Bombay) during different years.

Seasonal variations in effort, catch and catch rates : As mentioned above, the premonsoon period consists of four months, the monsoon three months and the postmonsoon period five months. Therefore, for comparison of effort, catch and catch rates between different seasons as well as between the same season in different years, monthly average catch and effort in each season are calculated. At Vizhinjam, peak effort of hooks and lines is seen in monsoon period in two years (1984-85, 1987-'88) and in postmonsoon period in two years (1985-'86, 1986-'87) (Fig. 6), but peak catch of threadfin

The catch rates during the three seasons (Fig. 8) show that they are highest during monsoon period at Cochin and during premonsoon at Mangalore. There is no consistency in the periods of peak catch rates at Bombay and Veraval in different years. At Vizhinjam, peak catch rates are obtained in monsoon period in all years except in 1984-'85 when the same is obtained in postmonsoon period (Fig. 6).

The effort (Fig. 9) is highest during premonsoon period at Cochin, Mangalore and Veraval and

during postmonsoon period at Bombay. There is no fishing during monsoon at Mangalore and Veraval and the effort is lowest during this period at Bombay (Fig. 9).

the three seasons in different years (Fig. 10) shows that at Cochin, *N. mesoprion* is the most dominant species during monsoon period forming over 70% of threadfin bream landings in this period and

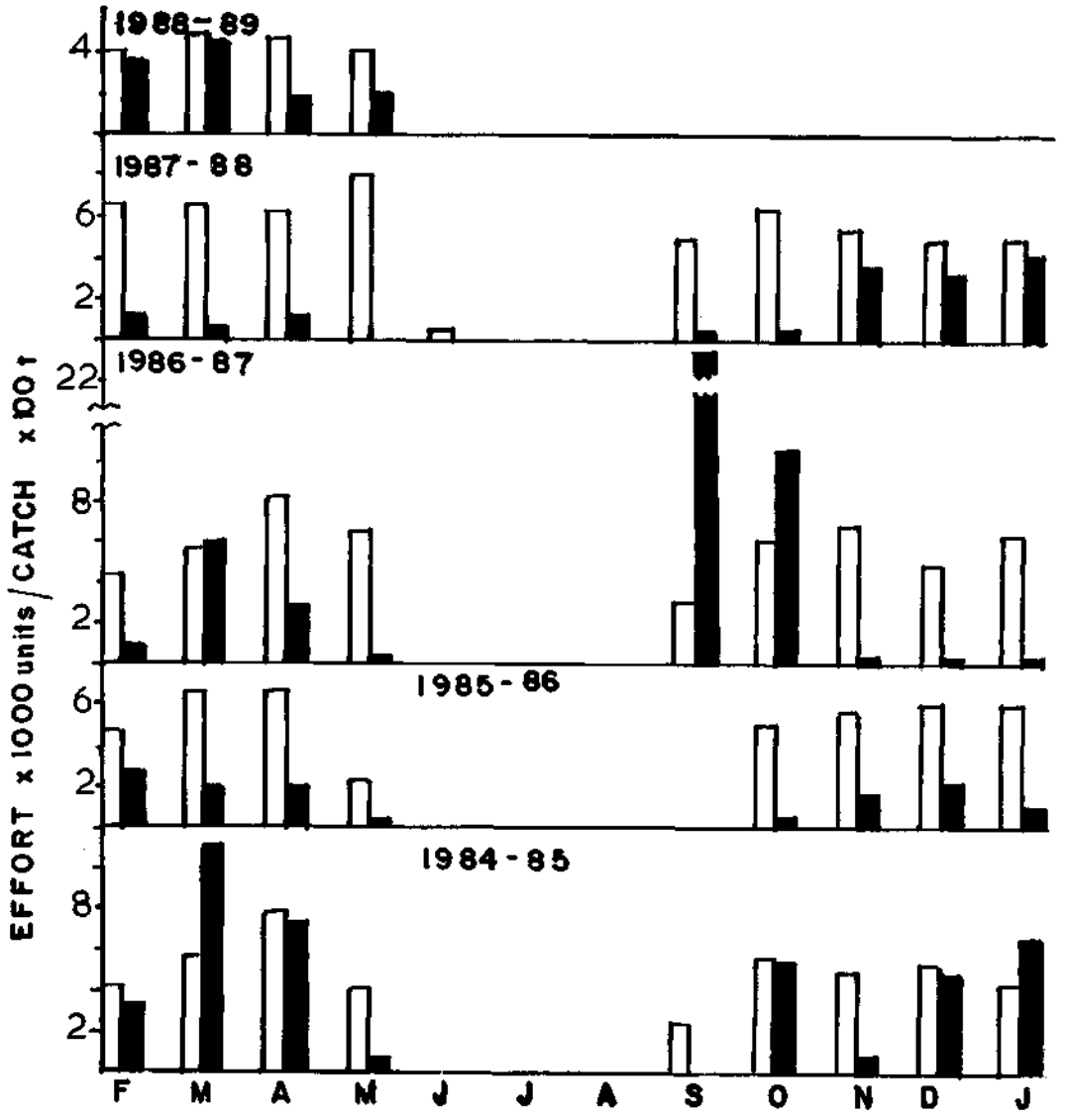

Fig. 5. Monthly estimated effort and catch of threadfin breams by trawlers at Veraval during different years.

Species Compositions

Along the west coast centres four species contribute to the fishery. These are *N. japonicus, N. mesoprion, N. delagoae* and *N. metopias*. Of these, *N. japonicus* and *N. mesoprion* are most dominant, together forming over 95% of threadfin bream landings. *N. delagoae* does not form any significant proportion in nemipterid catch and *N. metopias* is principally encountered at Vizhinjam only. The abundance of *N. japonicus* and *N. mesoprion* during about 55% of nemipterids obtained in the annual landings. *N. japonicus* is the dominant species during pre and postmonsoon seasons. The three species contributing to the fishery at Vizhinjam are *N. metopias, N. delagoae* and *N. japonicus*, the first one being the dominant. Peak catches are obtained in monsoon period and *N. metopias* forms about 95% of nemipterid catch during this period.

At Mangalore *N. japonicus* is the most dominant species in the premonsoon and postmon-

soon fishery although *N. mesoprion* is also caught in small quantities during the period.

At Bombay where the fishing during monsoon is very poor (Fig. 9), *N. japonicus* is the predominant species in all the seasons (Fig.10) forming about 70% of the threadfin bream catch. At Veraval there is no fishing during monsoon and *N. japonicus* is the most dominant species during both pre and postmonsoon periods forming around 80% of threadfin breams catch in each year.

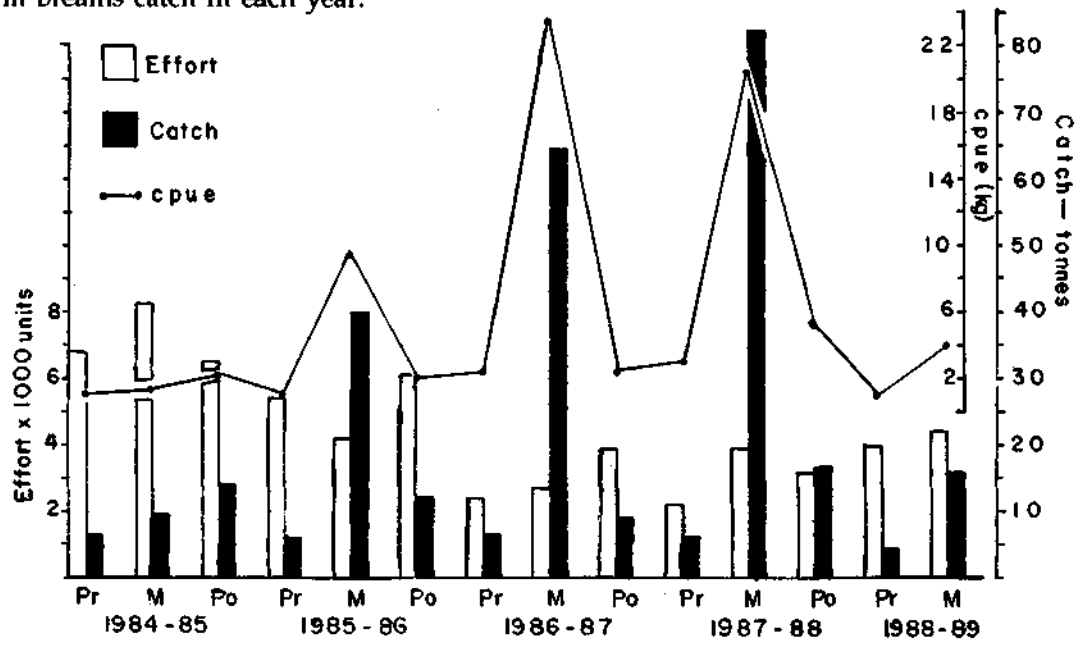

Fig. 6. Estimated effort, catch and catch per unit of effort of threadfin breams during premonsoon (Pr), monsoon (M) and postmonsoon (Po) seasons in different years at Vizhinjam.

It is thus clear that the monsoon fishery is largely supported by *N. mesoprion* at Cochin whereas at other centres the dominant species is *N. japonicus* during all seasons and at Vizhinjam the dominant species in monsoon is *N. metopias*.

Length Composition

The distribution pattern of length range and mean length of *N. japonicus* and *N. mesoprion* in the catch in each season during different years is depicted in Fig. 11 and 12 respectively.

N. japonicus : At Cochin, the length range of catch is 30-309 mm with variations during different seasons. Larger fishes are caught during monsoon in all years and the mean length is the highest (except during 1984-'85) during monsoon period; the mean length is lowest during postmonsoon period (Fig. 11). At Mangalore, the length range of the species in the catch is 60-289 mm. At Bombay, it is found to be 70-329 mm during the entire period; the mean lengths are (Fig. 11) the highest during postmonsoon period and the lowest in the monsoon months. At Veraval, the length range during the entire period is 30-309 mm; the average lengths are larger in premonsoon period during first two years and in the postmonsoon period during later period (Fig. 11).

N. mesoprion: At Cochin, as in the case of *N. japonicus*, the highest mean length is recorded in the monsoon period and the lowest during postmonsoon months, the length range in the catch in all years being 30-269 mm (Fig. 12). At Mangalore, the specimens in the length range of 70-205 mm constitute the fishery of pre and postmonsoon periods. At Bombay, the length range in the catch is 70-259 mm and there is no definite pattern in the distribution of mean lengths in different seasons during different years and the mean lengths show a very narrow range (Fig. 12). At Veraval, the length range in the catch is 40-299 mm; the highest mean lengths are at 168 mm during premonsoon period in 1984-'85 and at 139 mm during postmonsoon period in 1985-'86. In 1986-'87, the mean lengths are more or less same during both pre and postmonsoon periods, but larger fishes are caught in the latter period.

Spawning

It is known that the spawning period of nemipterid species of India is protracted and that these fishes are fractional spawners (Murty, 1982, 1984; Vivekanandan and James, 1986) like several other Indian marine fishes.

off Mangalore extends from November to April with peak during December-February. As there is no fishing here during monsoon there is no information on spawning during this period. In the sea off Bombay, mature adults are available round the year, but peak spawning appears to take place

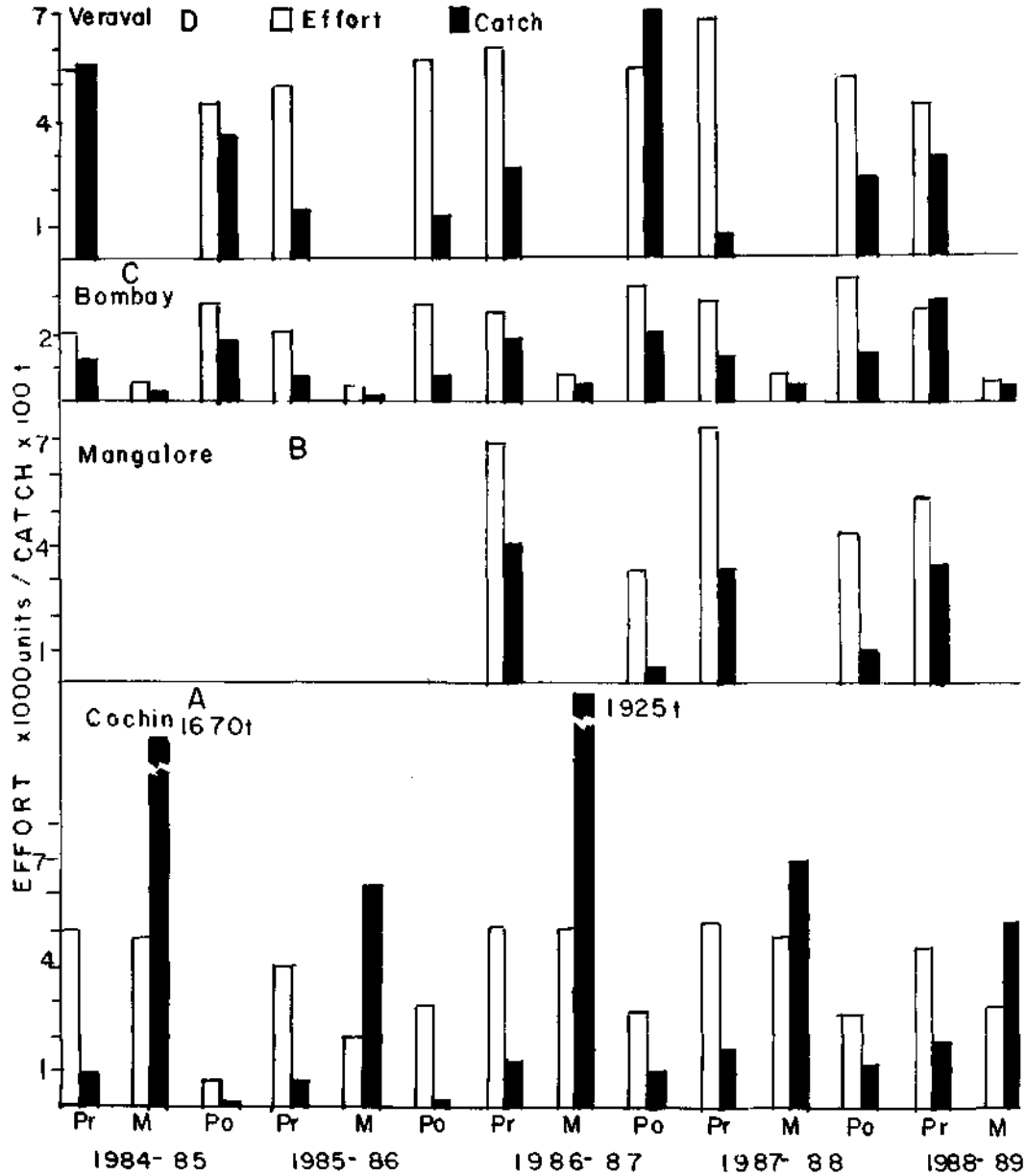

Fig. 7. Estimated effort and catch of threadfin breams during premonsoon (Pr), Monsoon (M) and Postmonsoon (Po) seasons in different years at different centres.

N. japonicus (Fig. 13) : At Cochin gravid adults are observed during monsoon and postmonsoon periods; peak spawning appears to take place in monsoon period. The spawning season in the sea during monsoon. At Veraval there is no fishing during monsoon and spawning appears to take place during pre and postmonsoon periods with peak during latter period.

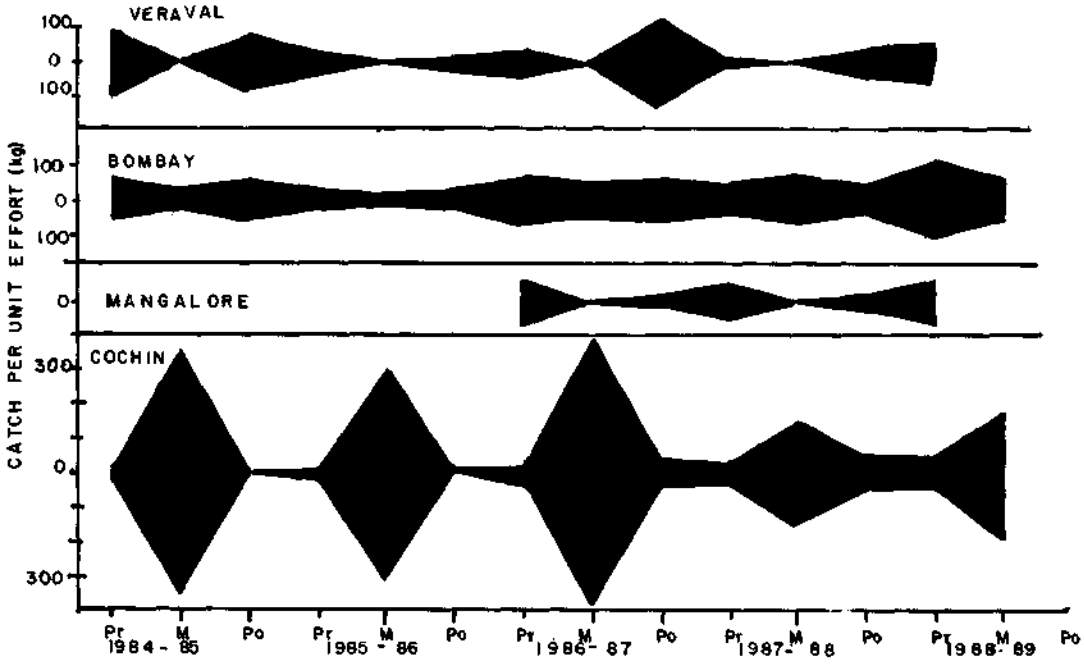

Fig. 8. Estimated catch rates of threadfin breams during different seasons in different years at different centres (Pr : Premonsoon, M : monsoon, Po : Postmonsoon).

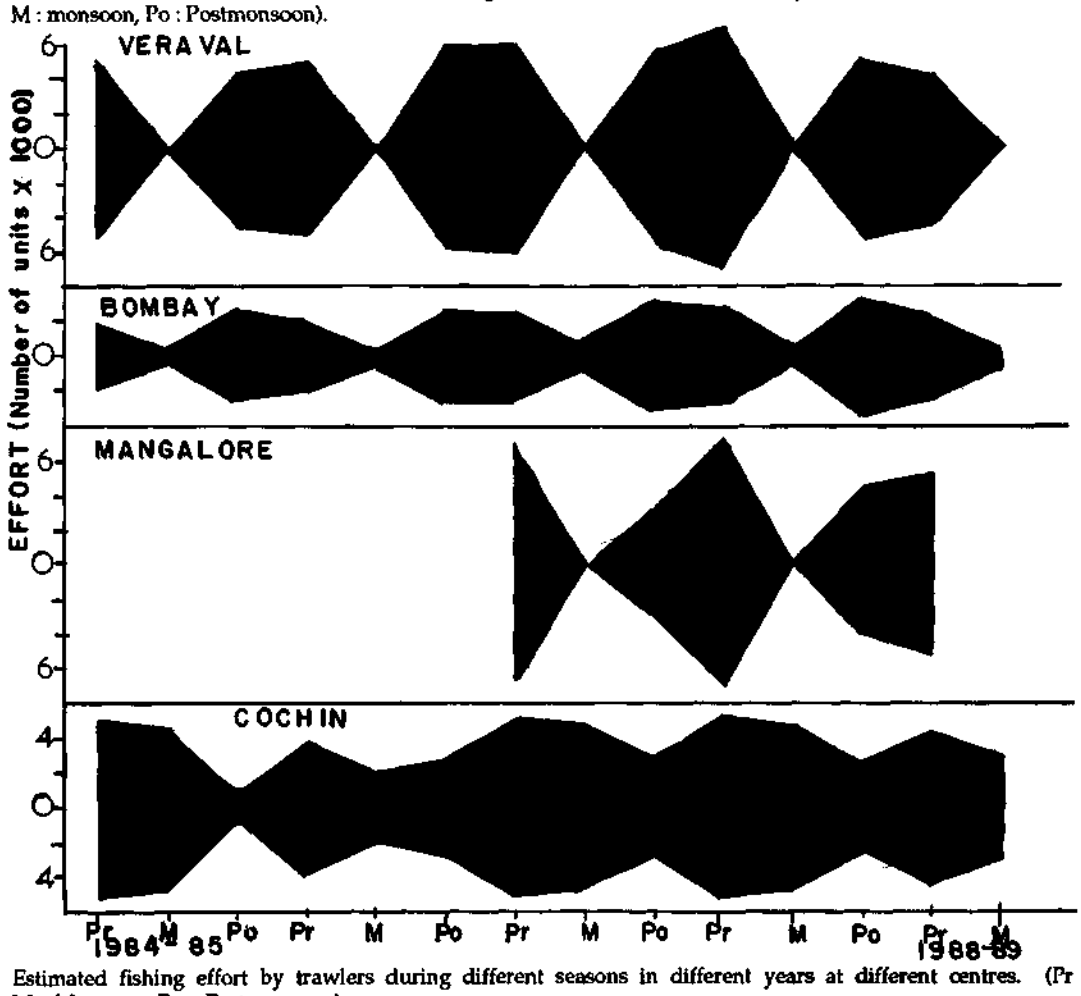

Fig. 9. Estimated fishing effort by trawlers during different seasons in different years at different centres. (Pr : Premonsoon, M : Monsoon, Po : Postmonsoon).

N. mesoprion (Fig. 13) : Off Cochin, this species spawns during monsoon and postmonsoon periods with peak in the latter period. In the sea off Bombay the spawning appears to take place round the year with a peak during monsoon period. At Veraval there is no information during monsoon; spawning takes place during pre and postmonsoon periods with peak during the latter period.

exploited stocks with varied success (Naamin, 1984; Garcia, 1986). Similarly, closure of selected trawling grounds is resorted to protect fish on spawning grounds, those migrating through areas of restricted extent where they are especially vulnerable to capture, to protect young fish on nursery grounds or to prevent or reduce conflicts between fishemen of artisanal and mechanised gears.

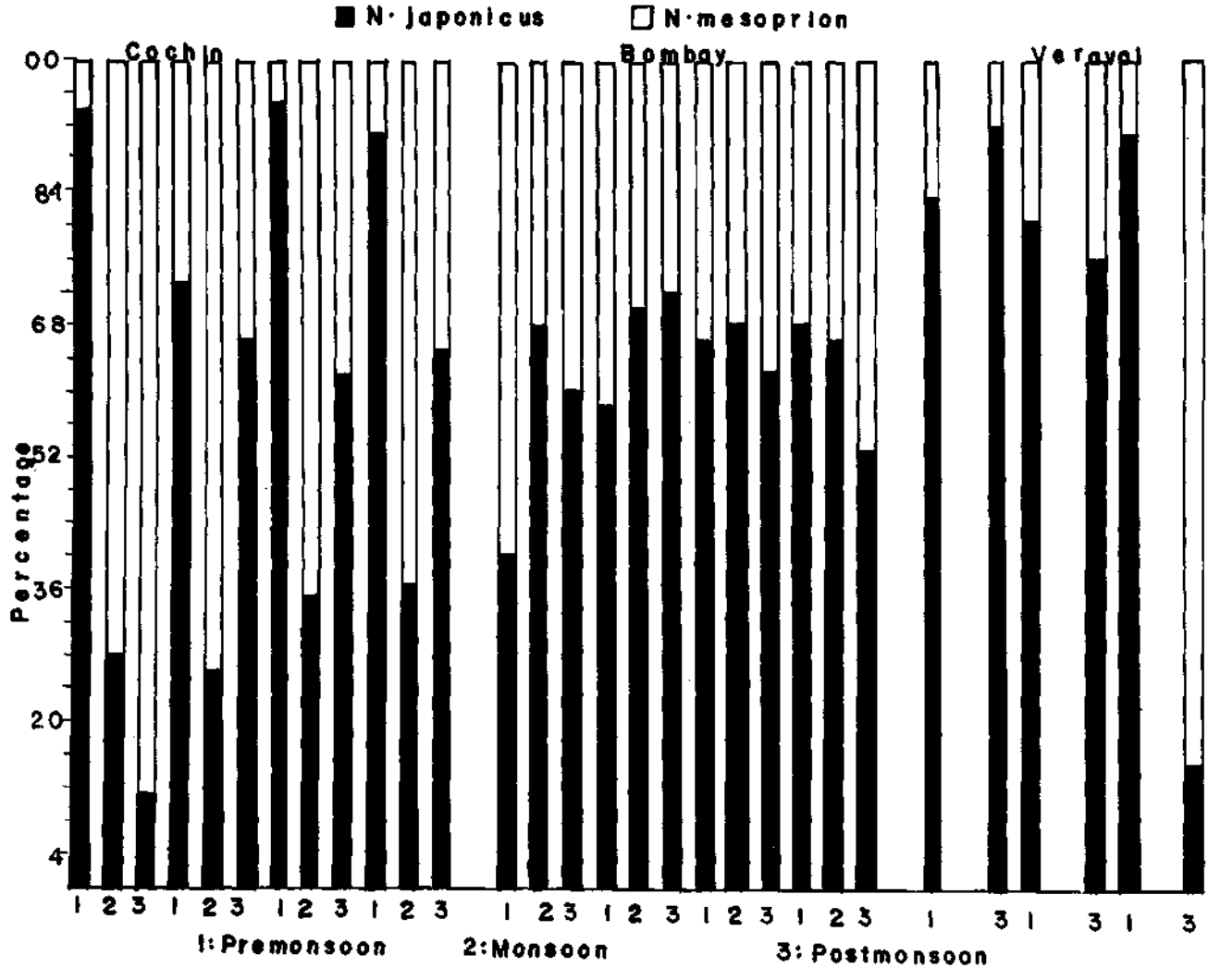

Fig. 10. Percentage composition of *N. japonicus* and *N. mesoprion* in each season in different years at different centres (two more species also occurred, but in very small quantities and therefore ignored in this graph).

Discussion

Closure of certain areas in the sea for fishing and banning fishing during certain seasons are among the important and wellknown methods of management of exploited resources. In the tropics, total or seasonal bans on trawling are known to have been implemented for rebuilding the

The neritic areas in the sea are known to be nursery grounds for a great majority of fishes. According to Rounsefell (1975), though this "area is small in comparison to the area of the waters overlying the deeper ocean, it is the scene of greater share of the world's fisheries and this ranks high in importance" and Garcia (1986) states that "... in most tropical areas, the fish production originates

in the littoral areas where fingerlings become benthic before starting to migrate towards deeper water, growing in size and decreasing in numerical abundance". According to Nagabhushanam (1971), the juveniles of larger fishes which inhabit deeper waters, are most abundant in the shallower regions less than 20 m forming 70% of total catch from within this area. James and Adolph (1971) also made similar observations. In the case of threadfin breams, particularly *N. japonicus*, Nagabhushanam (1971) and Nair and Jayaprakash (1986) observed larger fish in deeper waters and smaller fish in shallower regions. Weber and Jothy (1977) and Pauly and Mortosubroto (1980) found in the nemipterid fishes of South China Sea, a positive correlation between size of fish and depth in which they are caught indicating again that the larger fishes inhabit deeper waters and the smaller fish the shallower regions. The mean lengths of *N. japonicus* and *N. mesoprion* off Cochin are larger during monsoon months (Fig. 11 and 12); this apparently is due to the movement of relatively larger fish from relatively deeper water into shallower areas due to upwelling (*vide infra*). Thus the littoral areas serve as nursery grounds for majority of fish including threadfin breams. Therefore trawling in these areas (even with nets having larger cod end mesh size) destroys large number of young fish which congregate in these areas. Rounsefell (1975) states that closure of such areas is an effective way to prevent destruction of young fish. Further, an undesirable consequence of indiscriminate trawling in the nursery grounds is that, in the long run, the fish become progressively smaller and exploitation tends to be limited to shallower inshore regions as relatively deeper waters do not offer scope for any viable activity. These considerations prompt enforcement of ban on trawling in shallow inshore areas.

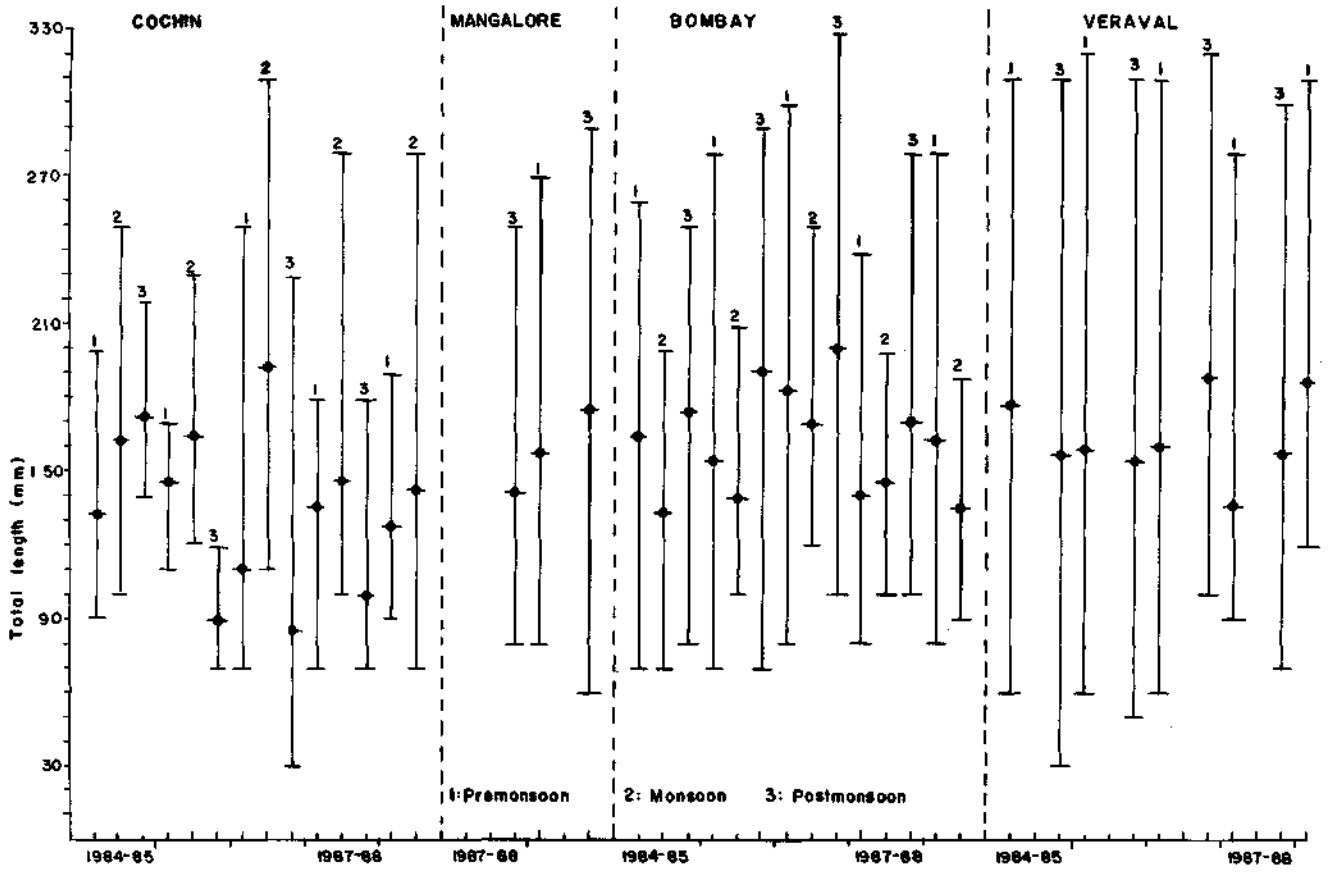

Fig. 11. Length range and mean length of *N. japonicus* during different seasons in each year at different centres (The vertical line shows the length range and the closed circle with a small horizontal line on the vertical line, the mean length).

Implementation of closed seasons in the tropical waters is also an established method of management of resources. According to Garcia (1986), closed seasons "are easily enforceable and, if implemented at the appropriate time of the year, usually produce good results".

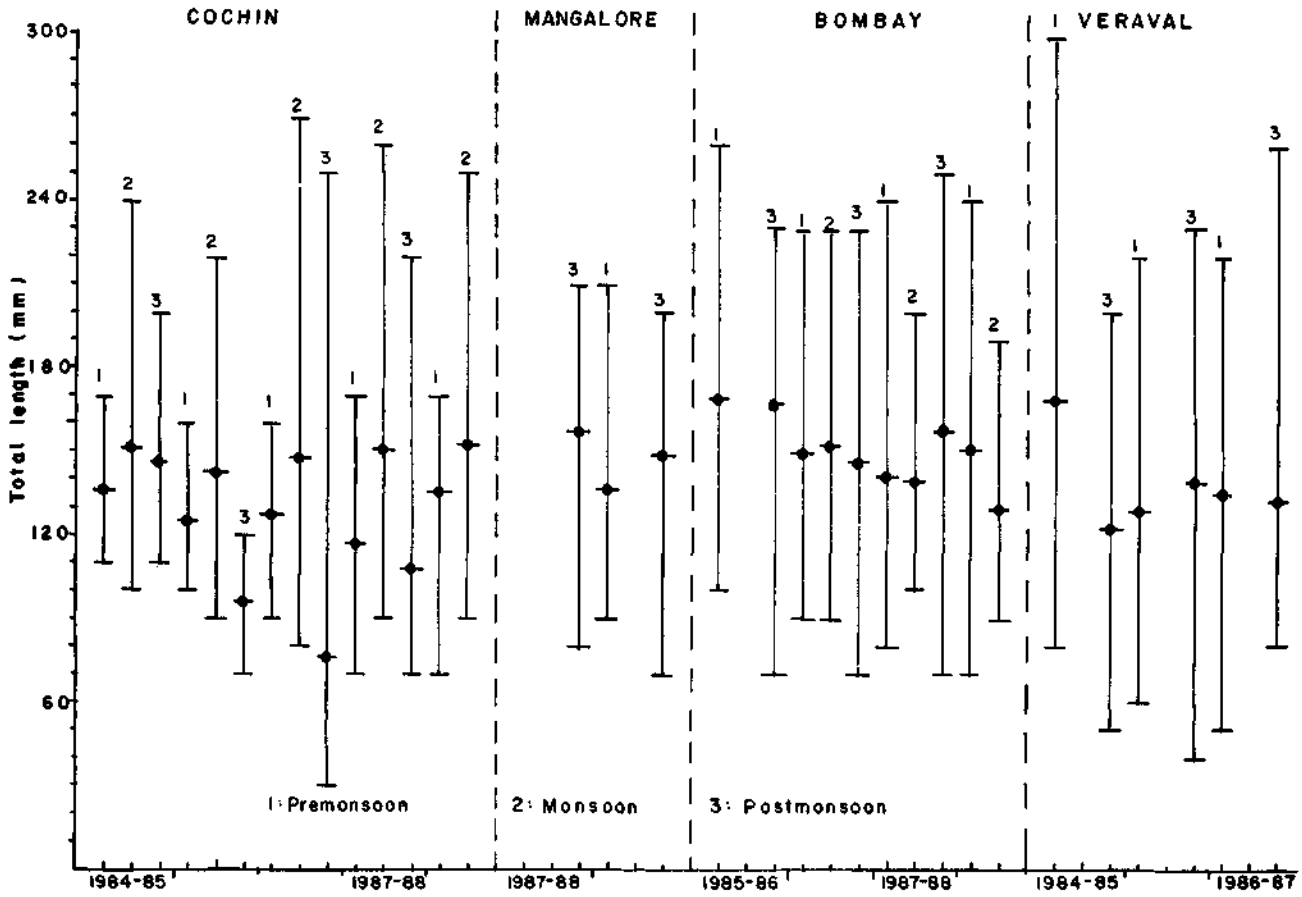

Fig. 12. Length range and mean length of *N. mesoprion* during different seasons in each year at different centres (The vertical line shows the length range and the closed circle with a small horizontal line on the vertical line, the mean length).

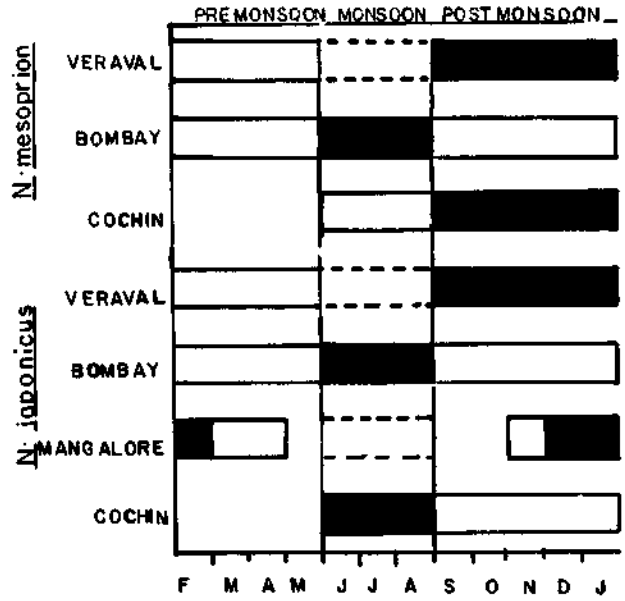

Fig. 13. Spawning periods and peak spawning periods of *N. japonicus* and *N. mesoprion* at different centres (Peak spawning period indicated by black bars; bars with broken lines indicate absence of fishing).

According to Banse (1959) strong upwelling takes place "from 8° to at least 15° N" during the whole southwest monsoon season along the west coast. Further, Banse (1959) observed "towards north the upwelling certainly reaches 15° and perhaps 18° N . . .". According to Rao and Ramamirtham (1976), upwelling takes place in the region between Kanyakumari and Karwar during monsoon period. Thus, upwelling region extends from off Kanyakumari to off southern Maharashtra. This upwelling influences the distribution of demersal fish population along the southwest coast of India (Banse, 1959; Nair and Jayaprakash, 1986). As stated elsewhere in this paper, the threadfin breams are more abundant in relatively deeper waters along the west coast and move into shallower depths of 35-40 m during monsoon to avoid oxygen deficient areas (Nair and Jayaprakash, 1986). Thus the threadfin breams are available in large quantities in intermediate depth zones during

monsoon. The upwelling off Karnataka Coast also is likely to result in such abundance of nemipterids, but there is no fishing in this region during monsoon.

Along Maharashtra Coast the fishing is poor and so also the catches and catch rates (Fig. 4, 8, 9). If there is any movement of threadfin breams into the fishing grounds during monsoon period as comparable to the one off Kerala Coast, one would expect the catch per unit of effort during monsoon to be very high here also, whereas the same is actually less than that in the other periods, indicating poor abundance of threadfin breams in the fishing grounds during monsoon. There is no trawling along Gujarat Coast during monsoon period.

It has been shown that *Nemipterus japonicus* and *N. mesoprion* are the two species that contribute to the bulk of the catches and *N. mesoprion* is most dominant at Cochin during the monsoon period (Fig. 10) and its contribution is very poor during other periods. A similar distribution can be expected along Karnataka Coast also, because of the upwelling in that region during monsoon.

It is known that Indian threadfin breams are fractional spawners having extended spawning periods (Murty, 1982, 1984; Vivekanandan and James, 1986). In the sea off Cochin, *N. japonicus* and *N. mesoprion* spawn during monsoon and postmonsoon periods with peaks during monsoon in the former and during postmonsoon in the latter species (Fig. 13). Since *N. mesoprion* is the principal species during monsoon (Fig. 10), there may not be any problem of recruitment overfishing for threadfin breams off Cochin, because of trawling during monsoon period. The information from Mangalore is rather inadequate. Off Bombay, spawning takes place in all the three periods (Fig. 13) with peak during monsoon in both the species. As the exploitation is very poor (Fig. 4 and 9) during monsoon there is no cause for concern. In the sea off Veraval, both the species spawn during pre and postmonsoon periods with peak during postmonsoon period (Fig. 13). Though there is no fishing during monsoon, there is every reason to expect spawning to take place during monsoon also. It is not possible to state anything about the impact of trawling during monsoon on stocks of threadfin breams off Gujarat as there is no information on distribution pattern of threadfin breams during different seasons and there is also no fishing during monsoon, along this coast. However, "most species in Indian waters, with the exception of a few inwhich seasonal breeding has been clearly established, are continuous breeders . . . " (Qasim, 1973). This is a positive feature and there does not seem to be any cause for concern about recruitment overfishing [provided the condition that the length at first capture (L_c) is maintained above or close to the length at first maturity, is met], because of trawling during a particular season (monsoon).

Seasonal trawling bans in overfished areas are known to give useful results as in the case of demersal fishes along the coast of Cyprus (Garcia, 1986). There is no trawling along Karnataka and Gujarat Coasts during monsoon period and the poor fishing activity during this period along Maharashtra does not offer any scope for concern on whether monsoon trawling should be permitted or not. Along Kerala, the considerable activity during monsoon can be the cause for concern, but the poor exploitation of threadfin breams during pre and postmonsoon months and fractional spawning habits and protracted spawning periods in these fishes can nullify any (if at all) adverse effect of fishing during monsoon on the stock of threadfin breams. This, however, should not lead to complaisance among managers of fisheries resources because :

1. The Indian marine fishes as also the threadfin breams, spawn over extended periods and the inshore areas are nursery grounds for majority of fishes and continued trawling in the littoral waters can lead to undesirable consequences,

2. as in the case of majority of Indian marine fisheries resources, the yields of threadfin breams also have reached levels where further increase in the same does not seem to be possible from the presently fished areas;

3. the demand for even smaller shrimps in the lucrative export markets has led, in almost all areas, to the reduction of the cod end mesh size of trawl nets, the consequence of which is the reduction in length at first capture (L_c). This in its turn can cause recruitment overfishing and collapse of demersal resources over a period of years.

Though the data on hand do not indicate adverse effects of trawling during monsoon on the stocks of the threadfin breams along west coast, closed season for trawling during monsoon can still be considered for implementation, because, in addition to the above reasons, it is known that such a practice will help rebuild the exploited stocks (most of which have almost reached a level where additional production from the present grounds is not possible) and prevent clashes between fishermen of artisanal and mechanised gears.

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