

OBSERVATIONS ON THE CARANGID RESOURCES OF THE SOUTHWEST COAST OF INDIA*

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ABSTRACT

Carangid fishery is of appreciable commercial importance as they promise very high yield outside the present fishing zone. They contribute significantly to demersal and pelagic resources of the southwest coast. Though there are many species reported, only few of them mainly support the fishery. Of these, species of the genera *Megalaspis*, *Decapterus* and *Alepes* are found to be the most abundant in the fishery. A comprehensive review of the information on the biology of these species are made. An attempt is also made to correlate the abundance with their larval occurrence.

Observation indicates that in recent years carangid fishery shows considerable increase in their landings. In general, favourable season for the fishery is during September to November period though they appear in the catches almost throughout the year. But individual species show variation in their season and area of occurrence. In the case of *M. cordyla* they are abundant during October to May in the northern area (11° N to 13° N). In the southern region (09° N to 10° N) adults with ripe and running stages are observed during April to May. Their larval study was very effective to delineate the spawning area and season.

The species of the genus *Decapterus* have a wide distribution. The fishing season starts in September with a peak in October. But unusually high quantity of mature specimens are often recorded during May; which indicates the possibility of their breeding movement. Their larval collections showed maximum abundance from Quilon to Cape Comorin region during May to November with a bimodal peak one in June and other in September.

With the approach of monsoon, *Alepes kalla* are found in abundance in pelagic trawl hauls operated between Alleppey and Cochin area. Juveniles and immature specimens are found to be dominant in the fishery. Recruitment of young ones to fishery are observed during July to October period. Distribution of their larvae showed that they are found more in the near shore waters of Cochin area.

Among the other carangids, species of *Selar*, *Caranx* and *Carangoides* are landed in fair quantities. Rest of the varieties support the fishery in general. No gear is exclusively employed for carangids. They are caught in mid-water trawls, pelagic trawls, purse seine and also in hook and line.

INTRODUCTION

CARANGIDS, commonly known as horse mackerels, scads and travellies are known to occur in fairly large quantities along the Indian Coasts. They are available almost throughout

the year and constitute a major fishery. On an average, annual landings for a decade showed that these fishes formed about 3% of the total marine landings in India. Considerable increase in landings are noticed in recent years. Statewise analysis showed that biggest yield are from Tamil Nadu, where they form 9% of the marine landings. Ranking next is Kerala, followed by Andhra Pradesh.

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In Karnataka, Maharashtra and Gujarat the catches are fairly good, whereas the landings are negligible in other states (CMFRI, 1986). Horse mackerels and scads are reportedly underexploited and large potential resource have been found outside the present fishing areas (Anon., 1976).

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TABLE 1. Yearwise catch details from 1981-82 to 1985-86 based on the IFP vessels

Year	Fishing effort (hrs)	Total catch (tonnes)	Caranx (tonnes)	C/H Total (kg)	C/H Caranx (kg)
1981-82	2590.00	305.80	18.53	118.06	7.15
1982-83	3107.37	271.40	21.77	87.35	7.00
1983-84	3437.23	374.04	27.47	108.83	7.9
1984-85	2528.12	436.25	29.29	172.57	11.58
1985-86	2524.96	309.11	37.16	122.47	14.71

Earlier reports on the biology and fisheries of different carangids are given by Chidambaram and Verkataraman (1946), Chacko and Mathew (1955), Kagwade (1965, 1967, 1968), Ravindranath (1966), Radhakrishnan (1973) and Sreenivasan (1974, 1976, 1978, 1982). Rao *et al.* (1977) estimated the stock size of

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MATERIAL AND METHODS

Catch and effort data pertaining to the trawling operations of the Integrated

TABLE 2. Monthwise/specieswise abundance of carangid fishes during 1981-'85

Species	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
<i>Megalaspis cordyla</i>	3635	3294	2893	2043	3513	488	206	304	665	848	4614	2125
<i>Decapterus dayi</i>	1010	170	785	1311	709	—	—	—	2673	8920	1785	1793
<i>Alepes kalla</i>	1216	781	1484	1154	1567	4550	4869	9219	8172	9691	3929	694
<i>Caranx</i>	3303	1295	4074	7073	2305	96	60	212	255	799	3344	4349
Total	9164	5540	9236	11581	8094	5134	5135	9735	11765	20258	13672	8961

horse mackerel, scads and travellies. Details of commercial exploitation of these groups are insufficient. Hence, a detailed study was made along the southwest coast of India and the results are presented in this report.

Fisheries Project during the period 1981-82 to 1985-86 and larval collections from zooplankton samples of UNDP/FAO Pelagic Fishery Project for the period 1971 to 1975 from Ratnagiri and Tuticorin have been utilized

for this study. Observations were made on total catch, fishing effort, area of operations and species composition. For biological studies different size, sex and maturity stages were collected. The Plankton collections were made with Bongo net having 0.505 mm mesh size along fixed profiles. The main purpose of the larval study is to locate the spawning area and season. This is also cross checked by examining the state of ripeness of adult fishes caught at different periods.

OBSERVATIONS

Fortythree species of carangids have been identified from the catches landed at Cochin (Premalatha, 1984). Of these only the species of *Megalaspis*, *Decapterus*, *Alepes*, *Selar*, *Caranx* and *Carangoides* are landed in fair quantities. The landings of carangid group of fishes in Integrated Fisheries Project have been steadily increasing for the last five years (Table 1). Though the fishery exists almost throughout the year, the favourable seasons are during September to November and March to May. Individual species shows variation in their seasonal abundance (Table 2). To the all India landings of carangids, the contribution of Kerala works out to 27%. The carangid landings in India for the year 1984-85 was estimated to be 59,000 tonnes (CMFRI, 1986).

Fishery of *M. cordyla*

Genus *Megalaspis* is represented by a single species *M. cordyla*. The fish has several detached finlets in the caudal region and are easily recognised by scutes on the lateral line. They are fast swimming and often form large shoals. They are usually caught by trawls and better catches are taken by purse-seine also. They appear to be more oceanic, but are generally found over the middle, outer and occasionally on the inner shelf water (40-120 m).

The present exploited level of catch is very less compared to the estimated potential. During the surveys of Pelagic Fishery Project, large concentrations of horse mackerels and scads have been found in between 50-100 m along the west coast and southeast coast (Anon., 1976).

The fish grows to a maximum size of 80 cm and attain sexual maturity at the length of 25 cm. The catches are usually composed of 30-40 cm individuals. Fishes of one and two year class mainly support the fishery. Adults with ripe and running stages are obtained during April-May and also in October-November. Regular observations on IFP catches have shown that horse mackerels are found to be more oceanic and are generally seen towards the central (09°-13°N) and northern area (13°-17°N) than on the southern region (07°-09°N). Incidentally the catch rate reported from the northwest coast was rather high and catches of 5-10 tonnes per haul were also recorded (Bapat *et al.*, 1982). The fishing season for *M. cordyla* is observed between October to May.

The larvae of *M. cordyla* outnumbered all other species in abundance, contributing nearly 20% of the total carangid fish larvae. Their distribution study was very effective to delineate the spawning area and season. The concentration of the larvae were more towards the northern region than the southern section; which very well agree with the adult distribution pattern (Fig. 1). The larval abundance was maximum (48.6%) in the shelf edge off Calicut area, followed by Kaiwar, Cochin and Quilon areas (Table 3). Seasonal distribution showed that there is an increase in the occurrence of larvae from March onwards and reaches a peak in June, when nearly 50% of the larvae obtained and from July to September a decrease in value noticed (Table 4).

Fishery of D. dayi

The species of *Decapterus* are an important pelagic resource of the mid-shelf waters. They

of *Decapterus* in Indian waters are in much controversy. The presence of *D. russelli* had been reported by Misra (1962) in Indian waters.

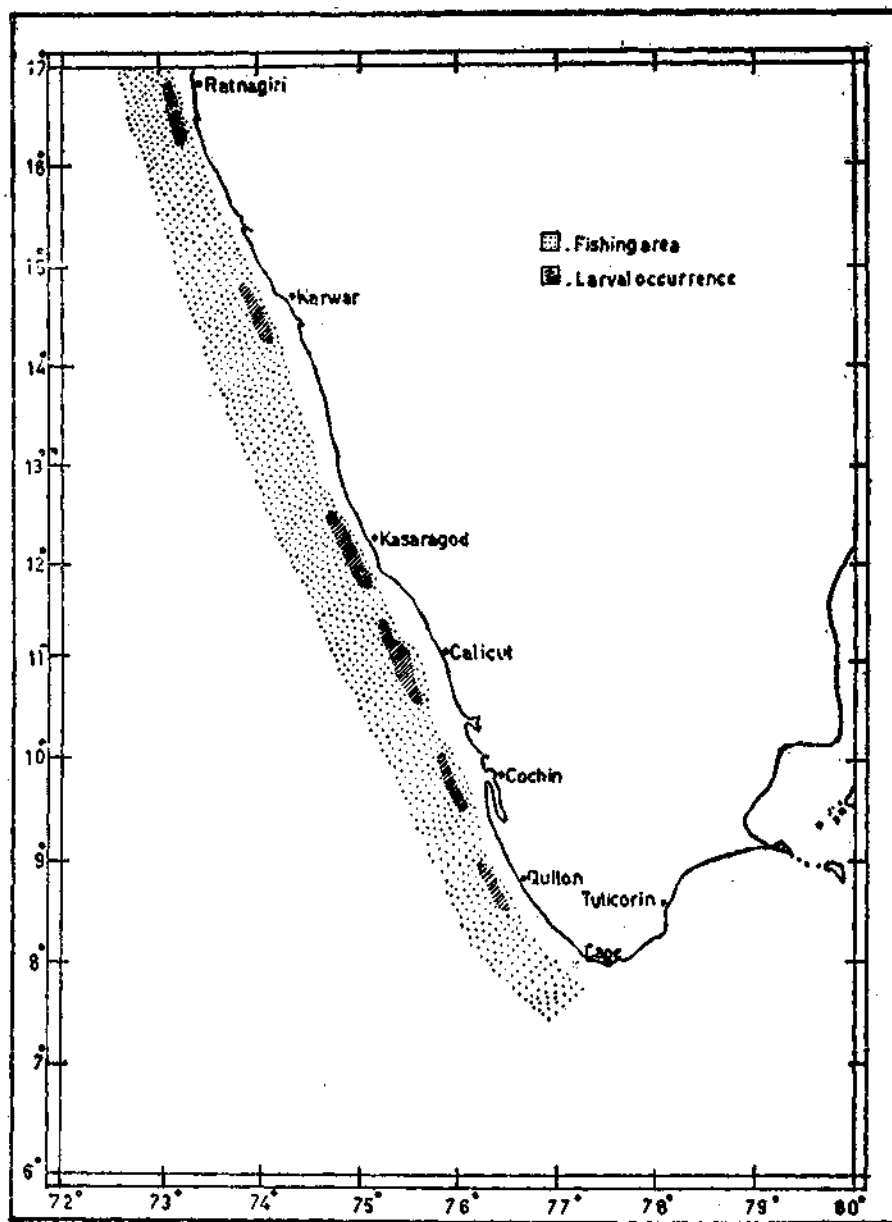


FIG. 1. Fishing area and larval occurrence of *M. cordyla*.

are shoaling species and appear sporadically in large quantities. The identities of the species Rao (1966) reviewed the works on decapterids and reported the occurrence of *D. dayi* in the

TABLE 3. Number of carangid fish larvae obtained from different profiles during September 1971 to September 1975

Area	Total hauls	Hauls with Carangid larvae	<i>M. cordyla</i> larvae	<i>D. dayi</i> larvae	<i>A. kalla</i> larvae	Other carangid larvae	Total
Tuticorin ..	77	36	2	37	2	33	74
Cape Comorin ..	141	75	2	77	3	605	687
Quilon ..	173	85	71	217	20	329	637
Cochin ..	236	98	64	185	199	337	785
Calicut ..	55	24	321	48	9	42	420
Kasargod ..	176	79	60	56	53	84	253
Coondapur ..	7	7	23	4	—	10	37
Karwar ..	206	67	75	14	19	96	204
Vengurla ..	5	3	—	—	—	—	—
Ratnagiri ..	208	57	42	18	15	101	176

TABLE 4. Number of carangid fish larvae obtained during different months from September 1971 to September 1975

Months	Total hauls	Hauls with carangid larvae	<i>M. cordyla</i> larvae	<i>D. dayi</i> larvae	<i>A. kalla</i> larvae	Other carangid larvae	Total
January ..	71	19	24	24
February ..	96	41	6	6	4	108	124
March ..	155	48	34	20	5	82	141
April ..	125	49	83	10	..	96	189
May ..	116	80	67	121	9	236	433
June ..	96	50	329	161	6	76	572
July ..	114	65	91	83	93	659	926
August ..	126	48	39	33	92	51	215
September ..	110	70	9	169	74	134	386
October ..	76	18	..	15	30	23	68
November ..	127	31	2	32	6	143	183
December ..	72	12	..	6	1	16	23

Arabian Sea, which is identical with *C. kurra* (1984) *D. dayi* is the synonym of *D. russelli* of Day (1878), Sreenivasan (1976) recorded the occurrence of *D. kurroides* in the Indian Ocean is poorly known. But taxonomic

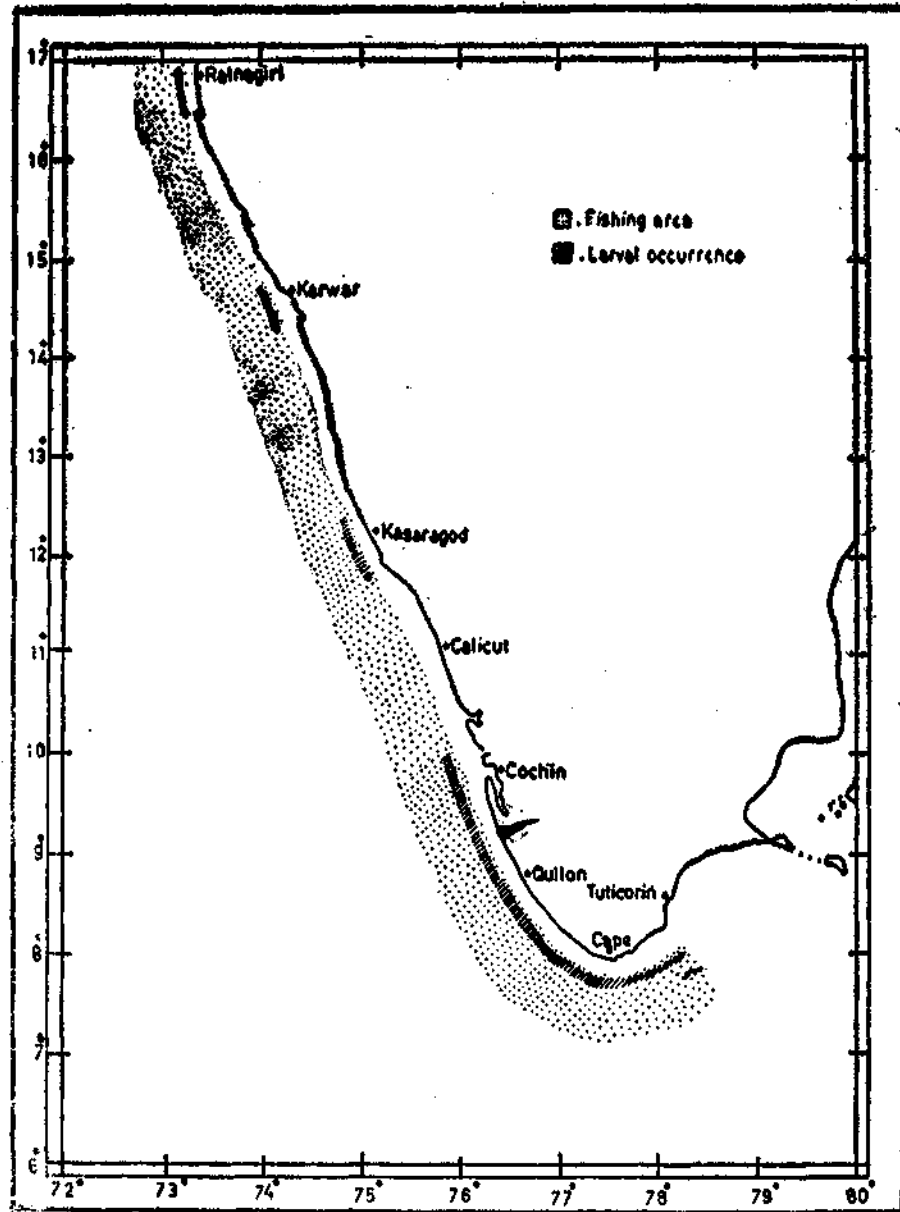


FIG. 2. Fishing area and larval occurrence of *D. dayi*.

area and made a study on the age and growth studies conducted during the larval identification of *D. dayi*. According to Fischer and Bianchi's classification showed that there are three morpho-

logically different forms of *Decapterus* along the southwest coast. The presence of red-tailed scad (*D. kurroides*), which is more robust in appearance with larger scales is often obtained from the deeper waters. The more elongate slender type with short pectoral fin is assigned to as *D. macrosoma*, usually obtained from the Wadge Bank area. The most commonly found species is *D. russelli*, an intermediate form of the above two. They are popularly known as mackerel scads and are caught mainly in trawl nets, boat seine and purse seine.

Fishes of 0-year and one-year class support the fishery. They attain sexual maturity during the first year of life at about 14 cm. Usually the catches are composed of 20-25 cm size individuals. Males were dominant in the catch. Observation on fishery showed great fluctuations in different months. There are two seasons, one in September to January and other in April to May. The main season starts in September with a peak in October. But unusually, high quantity of this species, nearly 6 tonnes in a single haul was recorded in May. Mature specimens are observed from May to July and October to November months, indicating the possibility that the species breeds over two periods. Spent ones are found in August to September and young ones in October from Cochin to Quilon regions.

Larval study indicated that the concentration of the larvae are more towards southern region i.e. from Quilon to Cape Comorin region (Fig. 2) (Table 3). Larval occurrence was maximum during May to November with a bimodal peakone in June and other in September, the season which is greatly influenced by monsoons (Table 4).

Fishery of *A. kalla*

The genus *Alepes* is represented by *A. djed-daba*, *A. macrurus*, *A. melanopectera* and *A. kalla*. In recent taxonomic studies (Fischer, 1984), this species is referred to as *C. para*. But in the present study, the name *A. kalla* is

retained as such, since there is no doubt of its identity. They are commonly called as 'golden scad' and caught from the coastal waters in abundance during June-July. Rather small sized fishes with less flesh, usually distributed in the shallow water area (within 20 m), changes its habitat to pelagic zone at the time of monsoon. They are caught mainly in pelagic trawls and form one of the major components of the 'shallow water mix', which include several other groups like silverbelly, glass perch, jewfish, butterfish, etc. They attain sexual maturity at 12 cm size, but the catches comprises 6 to 15 cm size specimens. Indeterminate and immature specimens are found to be dominant in the catches. Recruitment of young ones are observed in July to October months. Golden scads obtained from May to October are in ripe and running stages indicating the possibility of prolonged breeding season. The fishing season observed for the species is from July to November. It is seen that among the carangids landed at I.F.P., bulk of the landings are from pelagic trawls and the species landed being *A. kalla*. It should be emphasised that according to the diversified fishing programme of I.F.P., pelagic trawling is done during monsoon months and the season fall in line with the abundance of the species.

Distribution study of the larvae of *A. kalla* showed that their maximum abundance (62%) in the near shore stations of Cochin area, followed by Kasargod and Quilon regions (Table 3). Seasonal occurrence showed that more larvae are obtained during July to October; which is also coincided with the maturity stages of the adults (Table 4). Their abundance in shallow water, and larval occurrence in near shore stations strengthen the possibility of their coastal distribution (Fig. 3).

Utilization

Many of the carangids form good quality fish and are consumed in fresh condition. In

certain seasons, depending on the market profitably converted into fish meal, fertilizer demand they are dried in electric tunnel driers. and for live stock development.

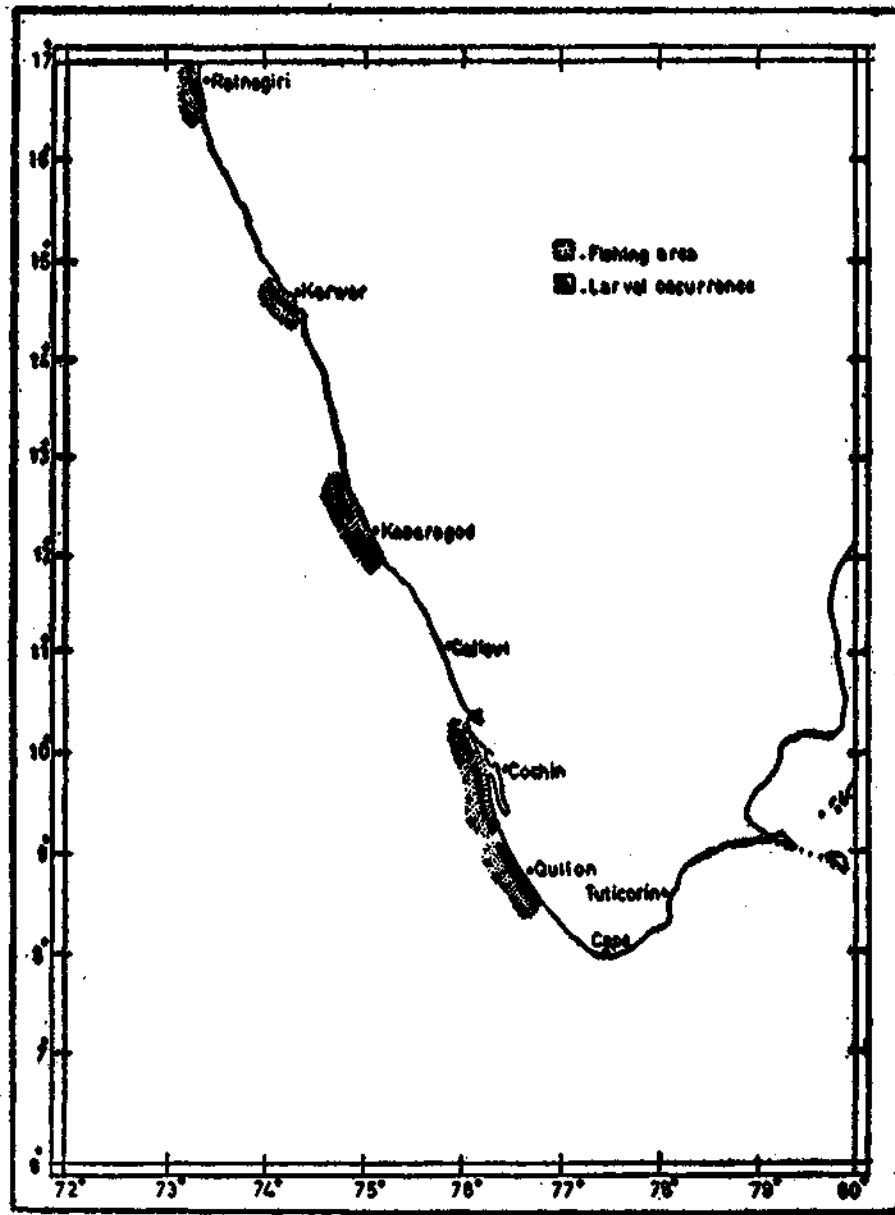


FIG. 3. Fishing area and larval occurrence of *A. kalla*.

Apart from being directly utilised as food, these fishes are suitable for conversion as fish kheema, fish powder and the like. Besides this, excess catches of small sized fishes can

DISCUSSION

Carangid resources are of considerable magnitude and great importance along the coasts

of India. Surveys throw light on the offshore distribution of these resources. Stocksize for horse mackerels and scads on an average along the southwest coast was estimated to be 1,41,000 tonnes (Anon., 1976). The present exploited catch is very less (nearly 20,000 tonnes) compared to the potential estimated. The resour-

present study is that the resources are available in plenty.

Based on the catch data of IFP vessels, the percentage of occurrence of different species are studied (Fig. 4 a). It was seen that on an average, horse mackerel form about 20%,

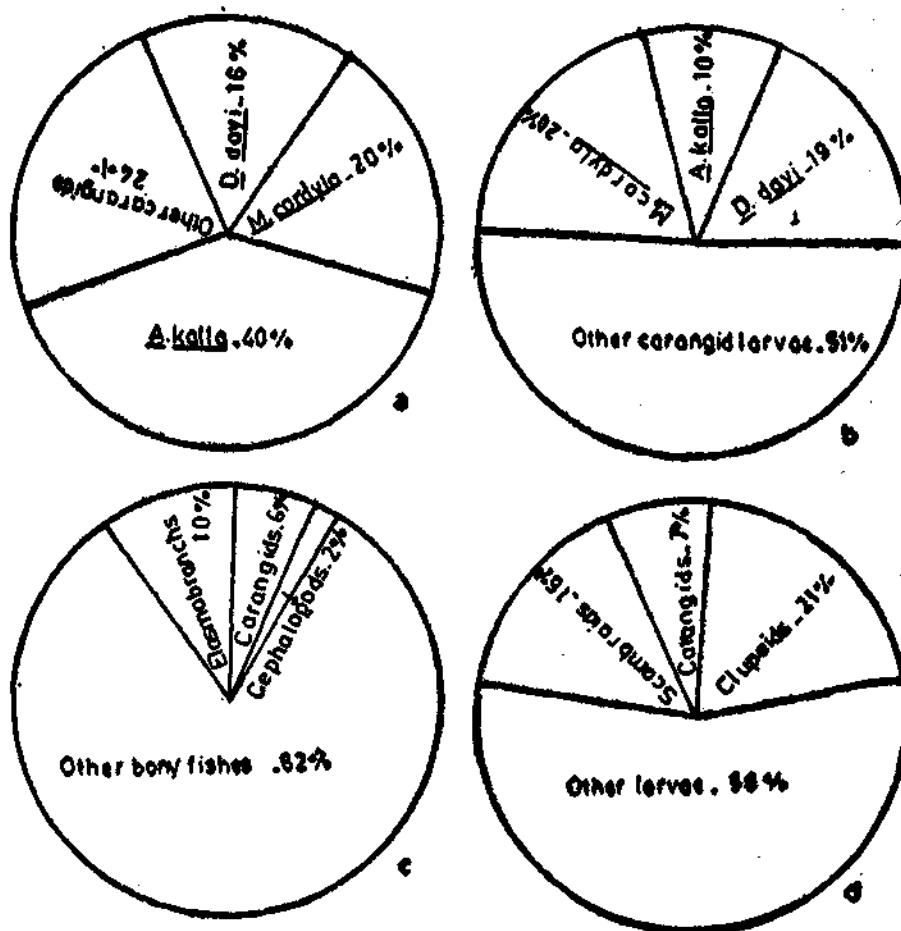


FIG. 4. Percentage occurrence of: a. different carangid fishes, b. carangid fish larvae, c. carangid fishes landed at IFP and d. carangid larvae in total biomass.

ces of the shallow water mix was estimated and the average standing stock was found to be of the magnitude of 90,000 tonnes. Although the potential estimated and related ideas of stock abundance vary considerably in many cases, the realities that emerge from the

scads 16%, golden scads 40% and other carangids 24%. The above proportions more or less correlate with the relative abundance of the species in total biomass. During larval survey, carangid fish larvae formed about 7% of the total larval biomass (Fig. 4 d), an

approximate representation of the carangid groups in IFP landings formed about 6% of the total catch (Fig. 4 c). In the case of larval percentage *M. cordyla* formed about 20%, *Decapterus dayi* 19%, *Alepes kalla* 10% and the rest belonged to other carangid fish larvae (Fig. 4 b).

Considering catch per unit effort as the relative index of population density, the resource structure was examined in total and carangids in general. It was observed that during the past two years, there is a steady increase in yield rate for carangid fishes. A catch rate of two-fold increase noticed during 1985-86 period i.e. from 7 kg/hr in 1984 to 14 kg/hr in 1986 (Table 1). The changes that occur in the total catch is the most important deciding factor, whether to encourage fishing or to introduce restrictive regulations.

As there is increase in landings of carangids during recent years, there is every possibility of better development for the fishery.

No gear is exclusively employed for carangids. They are caught mainly in mid water trawls. Experimental fishing with light attracted purse seine were also found to be very effective in capturing fast moving shoals of carangid fishes. There were incidences of 6-10 tonnes of horse mackerel and scads obtained in a single haul. So also, the abundance of 2-3 t of golden scads in pelagic trawl hauls indicate the availability of the resources. From this, it is evident, by employing efficient methods, the quantum of the catch could be increased. As the resources of horse mackerels, scads and trevallies are existing beyond the traditional fishing ground, there is better scope for the development in the fishery.

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