DEMERSAL FISHERIES OF VIZHINJAM*

N. RADHAKRISHNAN**
Central Marine Fisheries Research Institute, Cochin-18.

ABSTRACT

The average annual yield from the demersal fisheries of Vizhinjam amounts to 773 tonnes which forms about 29% of the total marine fish production of the place. The seasonality and the size composition of the fishery for silver bellies, balistids, pomfrets, prawns, cat fishes, scienids, elasmobranchs and perches are given. An analysis of the catch per unit of effort by the different gears shows that the general decline from 1965 to 1967 is probably due to reduction in the availability.

INTRODUCTION

This paper on the demersal species represents the second part of the account on the fishery resources off Vizhinjam, the earlier one dealing with the pelagic species (Radhakrishnan, 1973). The methods of analysis of the data is the same as has been followed in the earlier account. The only account of the fisheries at Vizhinjam is by Nayar (1958).

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ANNUAL PRODUCTION

The estimated annual catches for 1965, 1966 and 1967 were 2901, 3101, and 1929 tonnes respectively of which the percentage contribution of the demersal fishes were 28.80%, 29.42% and 29.58% respectively. The quarterwise demersal fish landings at Vizhinjam for the three years have been presented in Table 1.

LEIOGNATHIDS

Secutor ruconius and *S. insidiator* are the most important species of silver bellies available at Vizhinjam. Other species in the catches are *Leiognathus splendens, L. bindus, L. equulus, L. brevirostris* and *L. dussumieri.* This group occurs in the catches practically throughout the year. The total landings were

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** Present address: Offshore Fishing Station, 47|1 Strand Road, Calcutta-7.

TABLE 1. *Average quarterly landings of demersal fishes in Kg. at Vizhinjam.*

Species	Jan/Mar	Apr/June	July/Sept	Oct/Nov	Total
Leiognathus spp	4,800	13,499	16,784	12,070	47 153
S. capistratus	41,428	—	—	2,841	44,269
O. niger	1,702	—	2,640	51,356	55,698
Abalistis sp.	—	—	333	—	333
Tachysurus spp	944	63,908	1,25,992	38,474	2,29,318
Pomfrets	2,160	27,486	15,803	—	45,449
Lactarius sp.	—	6,796	15,236	2,643	24,675
Sciaena spp	—	10,353	28,151	954	39,458
Serranus sp.	7,500	—	—	976	8,476
Lethrinus sp.	—	—	—	1,222	1,222
Lutianus sp.	8,965	—	379	7,561	16,905
Theropon sp.	—	—	775	—	775
Nemipterus sp.	1,874	—	13,221	6,429	21,524
Epinephelus sp.	186	—	—	—	186
Holocentrus sp.	1,155	—	—	—	1,155
Upeneus sp.	—	1,643	40,035	—	41,678
Saurida sp.	930	—	18,104	1,481	20,515
Sphyraena sp.	2,091	2,589	3,875	3,377	11,932
Mullet	—	744	715	666	2 155
Cynoglossus sp.	248	—	—	—	248
Siganus sp.	—	775	—	—	775
Shark	19,546	21,139	30,242	37,536	1,08,463
Ray	3,847	6,121	10,488	9,312	29,768
Skate	1,914	—	—	—	1,914
Prawns	396	9,448	7,438	1,427	18,709
Total:	99,686	1,64,531	3,30,211	1,78,325	7,72 753

29,706, 61,242 and 43,967 kg in 1965, 1966 and 1967 respectively with an average of 44,971 kg. November — April period appears to be the best period of this fishery at Vizhinjam.

Secutor ruconius: The size ranges and the predominant modes recorded by an analysis of length frequency studies of the species at Vizhinjam during 1966 are given below;—

Month|year	Size range (mm)	Dominant modes (mm)
January 1966	15 — 40	25:35
February	30 — 55	35:45
March	35 — 65	50
April	30 — 85	35:45:55:65
September	90 — 110	95:105
October	60 — 85	70:75

It is seen that the entry of smaller individuals of *S. ruconius* of 25 mm size was noticed during January 1966. The monthly values of the different modes and their progressive shifting and their probable age are given in Table 2. Since the growth rate of *S. ruconius* after it attains a size of 25 mm is about 10 mm per month, this size might in all probability be about two months old. Judging by the progressive growth of the species, it can be assumed that the fish grows to about 105 — 110 mm in one year.

TABLE 2. *The progressive shifting of the modes in* S. ruconius

Modes	Progressive shifting of the modes									
'a'	25	35	50	55	—	—	—	—	95	—
'b'	—	35	45	—	65	—	—	—	—	105
'c'	—	—	45	—	—	—	—	—	—	—
Average size (mm)	25	35	46	55	56	—	—	—	95	105
Age in months	2	3	4	5	6	7	8	9	10	11

Secutor insidiator: The size range, and the predominant modal lengths observed from May 1966 to March 1967 are presented in Table 3.

It is seen that the smaller size groups were fished during October 1966 (35 mm) and February — March 1967 (30-35 mm). Larger size ranges (80-95 mm) were witnessed in the fishery during September — December 1966 and June 1967. The progressive shifting of the modes based on length distribution and the proboble age are given in the ensuing table. It is reasonable to believe that the 35 mm size group recorded in October 1966 might be about 2 months old and it can be concluded that the fishery of *S. insidiator* at Vizhinjam is mainly composed of O-year class.

TABLE 3. *Size ranges and dominant modal lengths of* Secutor insidiator

Month/year	Size range (mm)	Dominant modes (mm)
May 1966	60 — 80	70
August	50 — 70	55, 65
September	50 — 90	60-65, 80
October	20 — 95	35, 75, 90
November	45 — 80	50, 60, 70
December	70 — 90	75, 85
January 1967	40 — 55	45-50
February	30 — 50	35
March	20 — 75	30, 60-65
June	55 — 90	60, 70

Modes	The progressive shifting of the modes								
'a'	—	—	50	60	—	70	75	—	—
'b'	—	—	—	—	65	—	75	—	85
'c'	—	45	—	—	—	—	70	—	—
'd'	35	50	—	—	—	65	—	—	—
'e'	35	—	—	—	60	—	—	—	—
Average size in mm	35	47	50	60	62	67	73	—	85
Probable age in months	2	3	4	5	6	7	8	9	10

BALISTIDS

There is an important seasonal fishery for the balistids lasting only for a brief period of 3-4 months, commencing from December — January to March — April. They are represented by *Sufflamen capistratus, Odonus niger* and *Abalistes stellaris*. The average balistid landings were as follows: *S. capistratus*: 44,270 kg, *O. niger*: 56,033 kg and *A. stellaris*: 333 kg. *S. capistratus* constituted the bulk of the balistid fishery at Vizhinjam during 1965 whereas the fishery during 1966 and 1967 was mainly composed of *O. niger*.

A record of the sizes of balistids which enter in the commercial catches at Vizhinjam for the period 1965-67 is presented below. Measurements of standard length of the fish were taken in the case of balistids.

Sufflamen capistratus: 1964-65 *season*: The size ranges recorded during January, February and March were 82-182, 96-173, and 105-160 mm respectively. The modes 'a', 'b', 'c' and 'd' were seen in January 1965 at 95, 105, 115 and 130 mm (Fig. 1). Further shifting of the mode (a) was seen in February at 105 mm, (b) at 115 mm, (c) at 125 mm and (d) at 135 mm. Modes (b) and (c) appear to contribute to the fishery in March 1965 at 125 mm and 135 mm respectively. Thus, a regular shifting of independent modes takes place in successive months and the rate of growth shown by these individual modes was more or less uniform, 10 mm per month.

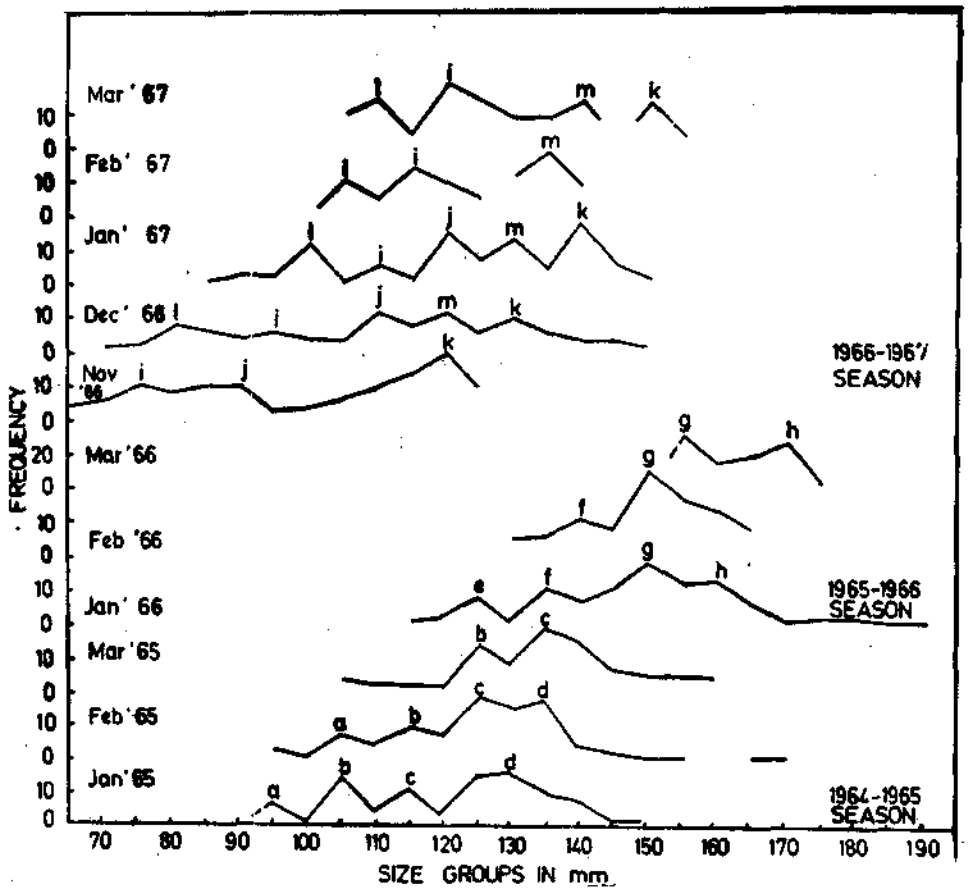

FIG. 1. Length frequency distribution of *S. capistratus* at Vizhinjam during 1965-67.

1965-66 *season*: The size ranges recorded for January, February and March respectively were 118-190 mm, 132-165 mm and 155-175 mm. Four modes appeared in January 1966 at 125 mm (c) 135 mm (f) 150 mm (g) and

160 mm (h). During February a bimodal curve was obtained with modes at 140 mm (f) and 150 mm (g). Mode (g) has shown a further shifting to 155 mm and mode (h) to 170 mm in March 1966.

1966-67 *season*: The size ranges noted for November 1966 to March 1967 respectively were 68-125, 75-152, 85-152, 103-141 and 105-155 mm. Mode (i) is seen in November 1966 at 75 mm, at 95 mm in December, at 110 mm in January, at 115 mm in February and at 120 mm in March. Mode (L) shifts from 80 mm in December to 100 mm in January, 105 mm in February and 110 mm in March. Similarly other modes also could be traced: (J) at 90 mm in November, at 110 mm in December and at 120 mm in January; (M) at 120 mm in December, at 130 mm in January, at 135 mm in February and at 140 mm in March; (K) at 120 mm in November and at 130 mm in December and at 140 mm in January.

Comparing the data for the three seasons it is seen that the younger size groups show a rate of growth of approximately 10 mm per month. It may be presumed that the individuals with modal sizes 75-90 mm recorded in November 1966 might be 6-7 months old and that during the first year, the fish shows a growth of 125-135 mm. The fishery appears to be mainly composed of 0 and I year class individuals.

Odonus niger: The length frequency distribution of *O. niger* from January 1966 to March 1968 is presented in Fig. 2.

The fishery witnessed during January and February 1966 may be the continuation of the 1965-66 season. The size ranges for January and February were 138-185 mm and 115-163 mm. The prominant mode in January was at 155 mm (a) where as in February it was at 145 mm (b).

1966-67 *season*: The size ranges recorded during November, December 1966, January, February and March 1967 were 79-115, 91-147, 72-152, 107-141 and 85-162 mm. The fishery was mainly constituted by mode (c) which showed its first appearance in November 1966 at 105 mm. The same mode could be further traced at 115 mm in December 1966, at 120 mm in January 1967 and at 125 mm in February 1967. Mode (d) also made its share in the season's fishery for 1966-67 and the shifting of the mode was seen thus: at 85 mm in November, at 95 mm in December, at 105 mm in February and at 115 mm in March 1967. Mode (c) showed its appearance at 140 mm in December 1966. Besides these modes (i) at 150 mm during January and March 1967 and (f) at 85-90 mm in March 1967 were also seen.

1967-68 *season*: The season commenced late, fishing having been observed from December 1967 and lasted till February 1968, the size range recorded were 82-152 mm. The predominant modes were (g) and (h) the former was seen at 105 mm in December 1967 and reappeared at the same

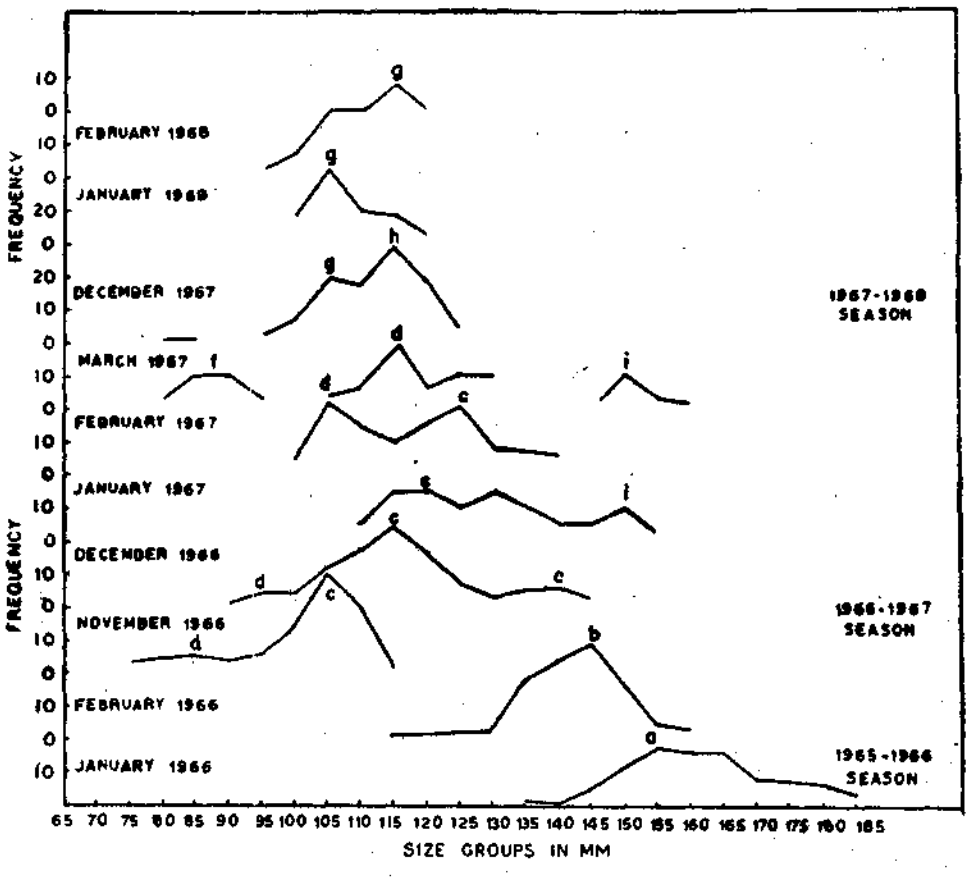

FIG. 2. Length frequency distribution of *O. niger* at Vizhinjam from January 1966 to March 1968.

position in January 1968 and at 115 mm in February. The latter mode (h) was at 115 mm in December 1967.

Viewing the length frequency distribution as a whole (Fig. 2) it is seen that the modes (c), (d), (g) and (h) contributed to the fishery during 1966-67 and 1967-68 seasons respectively showed the same trend in the monthly growth rate. It can be assumed that the bulk of the fishery is supported by a single age group and that during the different seasons under review the monthly growth rate appears to be more or less uniform.

CAT FISHES

Tachysurus thalassinus and *T. dussumieri* constitute the cat-fish fishery at Vizhinjam. The fishery generally starts in April and lasts till the end of the year. The peak months of the fishery were found to be August though

during certain years a subsidiary peak was noticed in September — October. The total quantities fished in 1965, 1966 and 1967 were, 2,82,381 kg, 3,04,349 kg and 1,01,227 kg respectively.

POMFRETS

The species available were *Parastromateus niger, Pampus argenteus* and *Pampus chirensis.* The duration of pomfret fishery was from March — April till August — September. The peak catches were recorded in April and June| July. During 1965, 1966 and 1967 the total catches were 62,133 kg, 42,389 kg and 31,827 kg respectively.

LACTARIUS

The season appears to commence in April and extend till September — October every year. The peak months of the fishery can be either in the close of the season (September — October) as was the case in 1966, and 1967 or in the beginning of the season (April — June) as in 1965. The total catch of *Lactarius lactarius* in 1965, 1966 and 1967 was 8,963 kg, 15,284 kg and 49,780 kg respectively. The average landings for the three year period works out to 24,675 kg.

SCIAENIDS

The common species landed are *Sciaena dussumieri, Johnius maculatus* and *Johnius osseus.* The fishery for *sciaenids* commences mainly during monsoon i.e. May — June and lasts till August — September, with peak landings in July or August. During 1965, 1966 and 1967 total sciaenid catches of 36,417, 53,689 and 28,301 kg respectively were landed with an average of 39,469 kg.

PERCHES

Different species of *Serranus, Lethrinus, Lutianus, Theropon* and *Nemipterus* are landed at Vizhinjam. The peak period of production of perches appear to be January to March, August and November to December. The total quantities landed during 1965, 1966 and 1967 were 32571, 65090 and 53078 kg.

GOAT FISHES

The common species are *Upeneus vittatus* and *Parupeneus indicus.* Generally the fishery commences sometime in April and lasts upto September every year. The peak catches were got either during April or August. The total catches of goat fish in 1965, 1966 and 1967 were 11245, 101909 and 11,883 kg. respectively with an average of 41,679 kg.

SAURIDS

The species represented were *Saurida tumbil* and *S. myops*. July — August appears to be the peak period for these fishes. The average annual landings of Lizard fishes, *Saurida* spp. in the three year period under report works out to 20,515 kg.

OTHER DEMERSAL FISHES

The average landings of fishes of the families *Sphyraenidae, Mugilidae* and *Pleuronectidae* in the three years under report were 11,607, 2,156 and 249 kg. respectively. These fishes are of minor importance as they formed only a meagre percentage in the total commercial catches.

ELASMOBRANCHS

The annual landings of elasmobranchs during the successive years were 1,08,464 kg., 29,771 kg. and 1,881 kg. respectively with an average yield of 46,705 kg.

The common forms of sharks landed were species of *Carcharias, Galeocerdo, Sphyarna, Scoliodon* and *Chiloscyllium*. They were caught almost throughout the year. On pooling the data of all the gears it is seen that the peak period of the fishery for sharks may occur between June and October. The yield was 1,58,434 kg., 1,03,978 kg. and 62,980 kg. respectively during 1965, 1966 and 1967.

The genera represented under Rays and Skates are *Myliobatis, Pristis, Rhynchobatus* and *Pteroplatea*. The fishery appears to be good during June — July and again during November — December. A total of 41,242 kg. was fished during 1965 but a decline was noticed during the subsequent years, the catches being 33,280 kg. during 1966 and 20,436 kg. during 1967.

PRAWNS

Penaeus indicus is the most important species available. Other available species are *Metapenaeus dobsonii* and *Parapenaeopsis stylifera*. The fishery is sometimes erratic yielding good quantities, mostly during the monsoon months of June to September. During the three year period the average harvest was 18,727 kg. the individual years fetching 22,593 kg., 24,783 kg. and 8,805 kg.

TREND OF FISHERIES

An attempt has been made here to find out whether the variations noticed in the catches (both demersal and pelagic species) obtained by different gears are due to any changes in effort put in or due to other causes. Data relating to the pelagic resources are taken from the authors earlier account

(Radhakrishnan, 1973). The following Table gives the figures of total catch and C.P.U.E. (catch per unit of effort) for the four important gears operated at Vizhinjam.

Year	Total catch (kg)	Effort	C.P.U.E. (kg)	Total catch (kg)	Effort	C.P.U.E. (kg)
	SHORE SEINE			*BOAT SEINE*		
1965	310414	2789	111.30	1081058	18854	57 34
1966	165413	2439	67.82	1873049	29155	64.24
1967	187966	2694	69.77	884356	27789	31.82
	DRIFT NET			*HOOK AND LINE*		
1965	493134	10099	48.83	858661	28793	29.82
1966	228256	8546	26.71	724994	28577	25.37
1967	181892	7000	25.98	408444	21330	19.15

From the above Table it is seen that there is a progressive decrease in the total catches, effort and the C.P.U.E. in the case of drift nets and hook and lines. The effort expended with shore seines, it may be said to be more or less the same whereas the catch and C.P.U.E. have declined. In the case of boat seines, no progressive trend is noticeable. Generally it can be said that the values of C.P.U.E. have certainly declined during the course of the three years. The causes of such a decline may probably be due to the variation in the availability of the fish population in the area. Catch and effort statistics for just over three years may not be sufficient to study the trends in the different fisheries of a particular locality. However, the trend is recorded with the available data and a detailed investigation appears to be necessary before the real causes can be determined.

Fishing is carried out at Vizhinjam throughout the year and is confined mainly to the inshore waters having a depth of 6-10 fathoms and extending upto about 24 kilometres from the coast. It is seen that the major fisheries of this area start just before the south-west monsoon. Gopinath (1954) and John (1959) have published observations made in the course of experimental deep sea fishing carried out off south western coast of India. George (1966) has stated "that lying between 35 to 70 fathom lines on the continental shelf are very rich fishing grounds characterized by an abundance of bottom dwelling fishes extending from near about Cochin in the north to the wedge Bank in the south". An exploratory survey covering the entire region will have to be done before fully exploiting the fishery wealth of this area. An increase in the yield of local fisheries will result from the introduction of modern gears and techniques.

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