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Occurrence of ribbonfish in the Indian EEZ

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ABSTRACT

The survey conducted by *FORV Sagar Sampada* during 1985-91 (90 cruises) revealed the occurrence of ribbonfish in 56 stations out of 904 stations where fishing was conducted. It was reported from 41 stations along the west coast and 14 stations along the east coast. About 14 tonne of ribbonfish was caught in these operations which formed 4.8% of the total fish catch. West coast was more productive and contributed 93.6% of the catch, while the east coast only 6.4%. It abundantly occurred in the southwest, centralwest, northwest and northeast coasts. Depth-wise study revealed that major portion of the catch was obtained from within the 100 m depth zone. The dominant species reported was *Trichiurus lepturus*.

INTRODUCTION

The exploratory surveys conducted by *FORV Sagar Sampada* in the Indian EEZ during 1985-91 were mainly aimed at charting out the exploited, underexploited and unexploited regions and to locate virgin fishing grounds. These fishing surveys had been successful in locating some areas of ribbonfish concentrations along the Indian coasts, especially on the west coast. Ribbonfish is one of the major pelagic fish resources and the average estimated catch in the commercial production during 1985-89 was 94555 tonne forming 5.3% of the all India marine fish landing. In 1992 this has reached an all time high of 111000 tonne forming 4.8% of the total catch and 9.4% of the pelagic groups. The present study is aimed to bring out the findings of *FORV Sagar Sampada* (1985-91) on the distribution and abundance of ribbonfish in Indian EEZ.

MATERIALS AND METHODS

During February 1985 to June 1991 *FORV Sagar Sampada* conducted 90 cruises covering 2234 stations in the seas along the west and east coasts of India and also

Lakshadweep and Andaman & Nicobar Islands. The number of cruises and stations covered in these cruises along the Arabian Sea and the Bay of Bengal were almost equal with 1129 stations in 46 cruises in the former and 1105 stations in 44 cruises in the latter. Fishing was conducted in 904 stations which formed 40.5% of the total number of stations. Out of this pelagic trawling was carried out in 370 stations (40.9%) and bottom trawling in 534 (59.1%) stations. Trawling stations were selected at random on the basis of echosounder/fish finder recordings, indicating the bathymetric profile, types of sea bottom and also the availability of fishable concentrations of all fishes and other marine resources. Depth of operation of the gear was decided on the basis of the above observations. The types of trawl nets operated in these cruises were mainly Chalute Bottom Trawl, High Speed Demersal Trawls (I, II, & III), Granton Bobbin Trawl and High Life Queen's Trawl. The fishing particulars and the quantity as well as quality of the catch (species-wise) were recorded in the fishing log maintained by every cruise. Since the ribbonfish catch in the pelagic trawling was nearly scanty the data collected from the bottom trawling was utilised in the present study. The hauls which contained the ribbonfish were considered as the effective hauls and further analysis of the data for the estimation of abundance was based on these effective hauls. The areas surveyed were divided into 1 degree square grids and the average ribbonfish catch (kg/hr) in each grid was estimated by dividing the total catch in each square by the number of effective hauls in that grid. The abundance was studied in different depth zones: 0-50 m, 50-100 m, 100-200 m and beyond 200 m.

RESULTS

The total catch realised in all these operations (Table 1) were 293 tonne, out of which 99.4% was obtained from bottom trawling. The catches of the pelagic trawling were totally poor, and the total catch realised was only 1.8 tonne forming 0.6% of the total fish catch and the ribbonfish catch was also negligible. The occurrence of

Table 1— A comparison of operational and catch particulars of fishing by *Sagar Sampada* between west and east coasts of India

Particulars	West coast	East coast	Total
Total number of fishing stations	496	408	904
Pelagic trawl stations	176	194	370
Bottom trawl stations	320	214	534
Total fish catch (tonne)	242.4	50.8	293.2
Catch in pelagic trawl (tonne)	1.6	0.2	1.8
Catch in bottom trawl (tonne)	240.9	50.5	291.4
No. of hauls with ribbonfish	41	15	56
Total ribbonfish catch (tonne)	13.1	0.9	14.0

ribbonfish was noticed in 56 stations covering 6.2% of the total fishing stations. Altogether 14 tonne of ribbonfish was landed in these hauls forming 4.8% of the total catch. The catch rate was estimated to 249 kg/hr of effective trawling and 26 kg/hr of total bottom trawling.

Abundance

West coast - Ribbonfish was widely distributed on the west coast than on the east coast. About 13.1 tonne of the total catch came from the west coast. It was collected from 41 stations, spread over 20 grids, between Longitude 68°- 70°E and Latitude 8°- 22°N (Fig.1). The frequency of occurrence was maximum on the Gujarat coast and also along the south Kerala and the central Maharashtra coasts. The minimum and maximum catches were 0.1 kg/hr in sts.743 and 737 (lat. 19°N- long. 60°30'E and lat.17°N-long. 70°30'E) and 3000 kg/hr at st. 1244 respectively (Table 2).

East coast - Compared to the west coast the ribbonfish catch in the east coast was much less and its distribution and abundance was limited to the northern sector, beyond 15 °N. The catch was reported from 14 stations spread over 9 grids and from one station at 13°10'N - 92°37'E in the seas around Andaman and Nicobar Islands coasts (Fig.1). Its distribution in the east coast was mainly off Orissa and north Andhra coasts. The total catch realised in 15 effective hauls, was 0.9 tonne forming 6.4% of the total ribbonfish catch on both the coasts, and 1.8% of the total fish catch in the east coast. The minimum and maximum abundance noticed were 0.1 kg/hr at st.1426 (16°15'N - 82°03'E, off central Andhra coast) and 492.8 kg/hr at st.1625 (off south

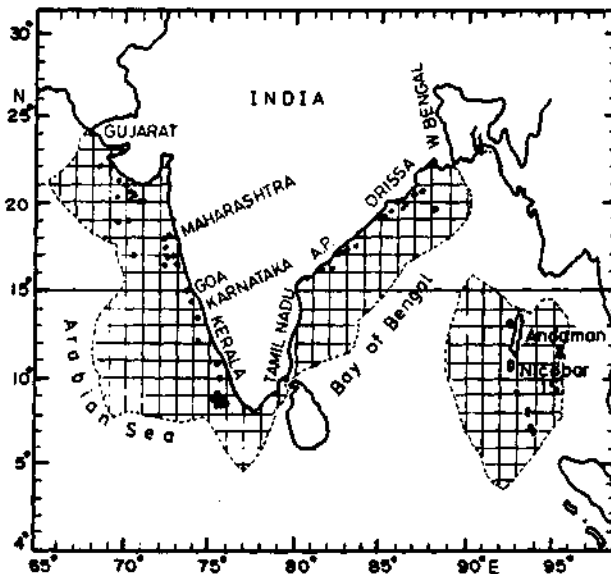


Fig.1— Areas of ribbonfish occurrence in the Indian EEZ recorded during FORV Sagar Sampada cruises

Table 2 - Station-wise abundance of ribbonfish in west and east coasts
(catch 30 kg/hr and above)

Cruise no.	St. (no.)	Lat. (N)	Long. (E)	Depth (m)	Catch (kg/hr)
<i>West coast</i>					
2	45	20°25'	69°38'	92	57.6
8	213	22°00'	68°30'	68	900.6
10	314	77°58'	72°14'	81	204.4
18	631	13°31'	74°16'	40	600.0
20	694	08°30'	76°00'	365	30.0
22	781	20°00'	70°56'	65	34.7
37	1213	18°02'	72°42'	36	1506.2
37	1217	20°00'	71°00'	74	350.4
37	1219	21°00'	70°00'	35	49.6
37	1220	21°15'	69°30'	46	96.6
38	1242	20°33'	70°23'	56	400.0
38	1243	20°31'	72°28'	56	150.0
38	1244	20°36'	70°19'	57	3000.0
39	1277	08°30'	76°00'	365	30.0
42	1309	08°40'	75°48'	340	1858.5
42	1313	08°57'	75°42'	335	280.0
42	1314	08°46'	75°43'	337	250.0
42	1319	08°44'	75°32'	315	2988.0
42	1320	08°46'	75°39'	305	40.6
87	2237	20°59'	70°00'	39	34.0
87	2238	20°27'	70°25'	65	70.0
<i>East coast</i>					
13	454	19°00'	84°50'	54	70.4
26	913	17°30'	83°38'	65	57.8
36	1206	20°38'	87°22'	35	60.0
57	1609	19°05'	85°09'	84	109.6
58	* 1625	19°47'	86°25'	68	492.8

Orissa coast) respectively (Table 2). The average catch rate in the effective hauls was estimated as 58.3 kg/hr. Though several cruises were conducted in the seas around Andaman and Nicobar Islands, ribbonfish was reported from only one station on the northwest coast of Andaman island with a catch rate of 25.2 kg/hr. The average catch per grid was maximum at 19°-20°N and 86°-87°E and minimum in 16°-17°N and 82°-83°E squares.

Depth-wise distribution

The ribbonfish was generally abundant within 100 m depth zone but good catches were observed in deeper waters also (Table 3). On the west coast, the average catch rate was 111 kg/hr in 0-50 m depth, 209 kg/hr in 50-100 m, 7.3 kg/hr in 100-200 m and 149 kg/hr beyond 200 m depth zones. This shows that 50-100 m depth zone contributed the maximum (43.9%) while 31.1% of the catch came from beyond 200 m depth. The least catch (1.5%) was noticed in 100-200 m depth zone. In the southwest region the ribbonfish concentrations were noticed in deeper waters while in the central-west coast they were in the coastal areas. Further north, off Veraval, they were abundant up to 100 m depth. The maximum catch rate of 3000 kg/hr was reported from 57 m depth. On the east coast, almost entire catch was from the coastal waters within 100 m depth. The average catch rates were 36.3 kg/hr in 0-50 m and 39.2 kg/hr in 50-100 m depths. Beyond 100 m depth it formed only 1 kg/hr (Table 3). Along the east coast the 50-100 m depth zone, which contributed 51.2% of the ribbonfish was found to be slightly more productive than the inshore area within 50 m depth, from where 47.5% of the catch was obtained. The maximum catch rate (493 kg/hr) was recorded from 68 m depth, off Chilka lake area. In Andaman and Nicobar area the reported catch of 25 kg/hr came from 65 m depth.

Species composition

Trichiurus lepturus, *T. auriga* and *Lepturocanthus savala* were the most common species in the catch. On the west coast *T. lepturus* formed 79.3% and the rest by *T. auriga* while on the east coast *L. savala* dominated forming 72.8% and the rest by *T. lepturus*.

DISCUSSION

The potential yield for ribbonfish up to 200 m depth zone of Indian EEZ, as estimated by the revalidation committee (Anon.1991) for the period 1985-89, is 311000 tonne which is 8% of the total potential yield of 3900000 tonne and the catchable potential yield is 30.4% at up to 50 m depth zone. The average exploited catch during 1985-89 was only 78384 tonne which clearly shows ample scope for increasing the catch. According to James & Pillai (1990) the present rate of exploitation of ribbonfish is much less than the potential yield. According to Rao *et al.*(1977) the standing stock of ribbonfish between the Gulf of Mannar and Ratnagiri was about 4 times of the then landings and suggested that its catch could be doubled without

Table 3 - Depth-wise distribution of ribbonfish (kg/hr) along the latitudes

Latitudes	Depth range (m)			
	0-50	50-100	100-200	Above 200
	<i>West coast</i>			
8° -9°N	—	—	—	592.7
9° -10°N	—	2.0	9.8	—
10° -11°N	24.3	—	—	—
11° -12°N	—	—	—	—
12° -13°N	—	—	—	0.5
13° -14°N	600.0	—	—	—
14° -15°N	5.0	—	—	—
15° -16°N	—	10.0	—	—
16° -17°N	—	3.0	4.8	—
17° -18°N	2.3	115.0	—	0.1
18° -19°N	36.0	13.1	—	0.1
19° -20°N	—	2.1	—	—
20° -21°N	39.0	419.2	—	—
21° -22°N	73.1	—	—	—
22° -23°N	—	900.6	—	—
Average	111.4	209.3	7.3	148.4
Percentage	23.4	43.9	1.5	31.1
	<i>East coast</i>			
13° -14°N	—	0.5	—	—
14° -15°N	—	—	—	—
15° -16°N	7.6	—	—	—
16° -17°N	—	2.8	1.0	—
17° -18°N	—	21.9	—	—
18° -19°N	—	—	—	—
19° -20°N	—	169.6	—	—
20° -21°N	65.0	1.0	—	—
Average	36.3	39.2	1	—
Percentage	47.5	51.2	1.3	—

adversely affecting the stock. Sivakami (1990) noticed abundant resource of *Trichiurus* spp in <50 m and 51-100 m depth range. Rao *et al.* (1977), based on the acoustic surveys and experimental fishing along the Kerala coast, located large concentrations of young *T.lepturus* (200-250 mm) at 250 m depth along the southern Wadge Bank area which, according to them, might be an important nursery ground for the species. Significant resource of ribbonfish along the northwest coast has been indicated during the exploratory surveys (Bapat *et al.*1982). Along the centralwest coast Chakraborty (1990) has observed that the stock of *T.lepturus* in Bombay waters is very sound and is not under threat of depletion. James & Pillai (1990) noticed good concentrations of the resource along the northwest, centralwest, southwest and northeast coasts.

According to Rao *et al.* (1977) good concentrations of ribbonfish occur up to 80 m depth along the Kerala coast from April to September with the maximum intensity between May and July. This has been endorsed (Lazarus *et al.* 1992), that in Kerala the peak period is during monsoon months while it is the pre- and the postmonsoon periods in other areas along the west coast. Rao *et al.* (1977) also observed that concentrations of ribbonfish shift northward from 8° to 16°N during November/December and thereafter a southward movement commences by about April/May and a good portion of biomass was found between 8° to 11°N from July to September when low salinity and temperature prevails due to southwest monsoon in this region.

All these earlier observations confirm that ribbonfish forms a major fishery along the west coast and is concentrated along the southwest, central, centralwest, northwest and northeast zones within 100 m depth area. As suggested by James *et al.* (1978, 1986) it has emerged as an important commercial fishery resource in the landings along the coasts of India especially in the southern and northern parts of the west coast. It may be concluded that, in the light of recent trends in the commercial ribbonfish fishery, the results obtained from the experimental fishing conducted by *FORV Sagar Sampada* on the distribution and abundance of ribbonfish along the Indian EEZ is a true indication of the fishery characteristics of the natural stock.

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