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# Trends in Landings by Trawls of Five Designs off Veraval Coast

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Variations in the composition of fish landed by demersal trawls of five different designs during the period of 1988-1993 off Veraval coast are reported in this paper. The average catch/h was 48.53 kg for the entire period. The catch rate was maximum (58.46 kg/h) during 1988-89 and it declined to 28.73 kg/h in the year 1992-93. The catch was dominated by ribbon fish (17%), cephalopods (8.7%) and sciaenids (12.9%) during the period. There was no significant difference in the catch rate of individual species in depth ranges of 20-30 and 31-40 m.

**Key words: Trawl fishery, Veraval, catch composition.**

Trawl nets of different designs developed by Central Institute of Fisheries Technology were introduced in Veraval during 1960 and this marked the introduction of this gear to the North-west coast of India. Performance of a number of demersal trawls of varying designs have been evaluated in the past by various workers (15.8 m six seam trawl, Deshpande *et al.*, 1970; 32m large mesh trawl, Kunjipalu *et al.*, 1979a; 25 m six seam trawl, Kunjipalu *et al.*, 1979b; 20 m large mesh and small mesh sputnik trawls, Manoharadoss *et al.*, 1998) and several designs have been recommended for use in this region. This investigation was undertaken to study the variation in the composition of fish landed by some of these demersal trawls during the period from 1988 to 1993.

## Materials and Methods

Data were collected from the landings of five fish trawls namely, 32m two seam large mesh (Kunjipalu *et al.*, 1979a), 25m two seam large mesh (Kunjipalu *et al.*, 1989), 20m two seam large mesh sputnik, 20m two seam small mesh sputnik trawl (Manoharadoss *et al.*, 1998) and 30m two seam, (Puthra Pravin *et al.* unpublished). The trawls were operated during 1988-1993 (except for 1989-90) from the departmental fishing vessel Fish. Tech No. 8 of OAL 15.24 m and fitted with 165 HP engine. The operations were carried out in the depth range of 20-40 m during day time. Rectangular wooden otter boards of size 1524mm x 762 mm weighing 100 kg each (Kurian *et al.*, 1964) were used during 1988-89 and upto March, 1991 and "V" form steel otter boards of size 1500 mm x 890mm, each weighing 125 kg (Kunjipalu *et al.*, 1984) for the rest of the period. Data such as depth, locations etc., collected during these operations were analysed to find out the trend in the landings by these trawl nets during the period. Variations in the catch from different depth ranges was also analysed.

## Results and Discussion

Annual catch, percentage of major groups of fish landed and catch/h are

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given in Table 1. The table shows that a total of 39985 kg of fish and shell fish were landed for the period from 1988-89 to 1992-93 expending 824 h of fishing effort. The catch was dominated by ribbon fish (17%), sciaenids (12.9%) and cephalopods (8.7%), for the whole period. Pomfrets, seer, whitefish, cat fish, elasmobranchs, mackerel, silverbar, crustaceans etc. were also present in the catch. Juveniles of the above varieties and economically less important fish are included in the miscellaneous group which contributed more than half (52.2%) of the total catch. Percentage composition of important groups of fishes during 1988-1993 is given in Fig.1.

Table 3 shows that the catch rate was maximum (58.46 kg/h) during 1988-89 and it declined to 28.73 kg/h in the year 1992-93. The average catch rate for the entire period was 48.53 kg/h. Fig.2 shows the catch/h of major groups in the fishery. Declining trend was observed in the case of ribbon fish also. The catch rate was 10.82 kg/h in 1982-83 which declined to 1.09 kg/h in 1992-93. The catch rate of *Chirocentrus* sp. declined from 1.37 kg/h to 0.17 kg/h, and that of white fish from 2.49 kg/h in 1988-89 to nil during 1992-93. However the catch of sciaenids increased from 3.29 kg/h to 10.28 and 10.02 kg/h during 1991 and 1992 respectively. The landings of cephalopods did not show much variations during the period except during 1990-91 when it was around 3 kg/h.

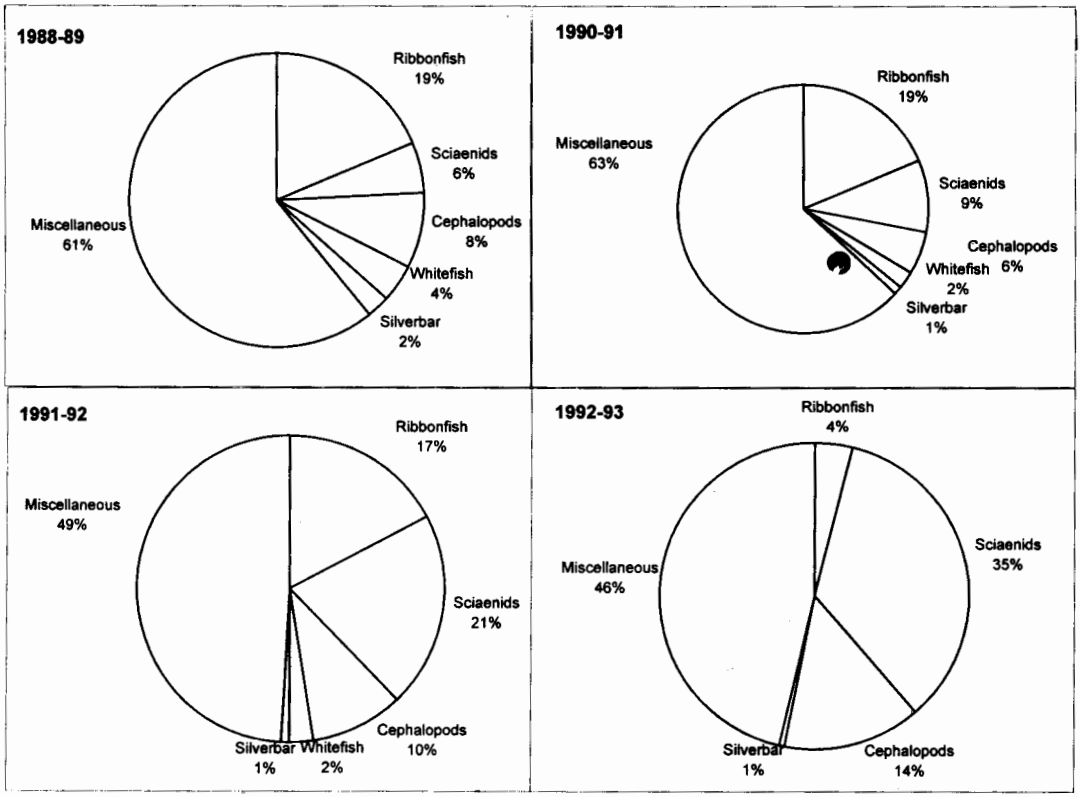


Fig. 1. Percentage composition of important groups of fishes during 1988-1993.

Table 1. Catch particulars (Kg) during the period (1988-93)

| Catch | 1988-89 | 1990-91 | 1991-92 | 1992-93 | Total | % | Catch/hr |
|---|---|---|---|---|---|---|---|
| Ribbonfish | 3171.50 | 1633.53 | 1867.20 | 121.50 | 6793.73 | 17.00 | 8.25 |
| Pomfret | 72.48 | 176.35 | 132.82 | 8.60 | 390.25 | 0.98 | 0.47 |
| Silverbar | 400.40 | 85.80 | 79.12 | 18.70 | 584.02 | 1.46 | 0.71 |
| Seerfish | 72.00 | 71.50 | 48.10 | 1.00 | 192.60 | 0.48 | 0.23 |
| Whitefish | 728.40 | 207.20 | 269.40 | 0.00 | 1205.00 | 3.01 | 1.46 |
| Crustaceans | 36.20 | 57.43 | 76.85 | 45.15 | 215.63 | 0.54 | 0.26 |
| Sciaenids | 964.00 | 817.40 | 2243.00 | 1115.00 | 5139.40 | 12.86 | 6.24 |
| Cephalopods | 1438.50 | 483.10 | 1076.70 | 462.80 | 3461.10 | 8.66 | 4.20 |
| Catfish | 56.50 | 38.65 | 95.40 | 0.40 | 190.95 | 0.48 | 0.23 |
| Elasmobranchs | 47.00 | 36.10 | 104.00 | 1 00 | 188.10 | 0.47 | 0.23 |
| Mackerel | 52.00 | 691.00 | 5.00 | 0.00 | 748.00 | 1.87 | 0.91 |
| Miscellaneous | 10092.40 | 4457.25 | 4892.63 | 1423.60 | 20865.88 | 52.20 | 25.33 |
| Total | 17131.38 | 8755.31 | 10890.22 | 3197.75 | 39974.66 | 100.00 | 48.53 |
| Fishing hours | 293.06 | 201.08 | 218.27 | 111.32 | 823.73 | - | - |

The declining trend observed in the catch rates may be attributed to the increase in the number of fishing trawlers operating in this region. It has increased from 1465 during 1988-89 to 2350 during 1992-1993 (Anon, 1995). The same trend was observed by Rao & Kasim, (1985) also. This has resulted in the migration of fishermen to distant waters in search of productive grounds.

Monthly variation of catch per trawling hour and catch and effort for the major groups of fishes are given in Table 2 and Table 3. The catch rate was high in the beginning of the fishing season and a peak is again seen in the months of April and May every year. Similar findings were reported by Philipose (1994). Catch rate for ribbon fish was high during November, March

Table 2. Monthly variation of catch (Kg) per trawling for the period (1988-93)

| CATCH | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY |
|---|---|---|---|---|---|---|---|---|
| Ribbonfish | 6.74 | 16.82 | 5.82 | 4.13 | 3.07 | 14.97 | 7.49 | 16.58 |
| Pomfret | 9.71 | 1.48 | 0.32 | 0.27 | 0.16 | 0.10 | 0.86 | 0.00 |
| Siverbar | 0.00 | 2.12 | 1.49 | 0.69 | 0.24 | 0.16 | 0.02 | 0.00 |
| Seerfish | 0.00 | 0.91 | 0.21 | 0.23 | 0.12 | 0.06 | 0.02 | 0.00 |
| Whitefish | 0.00 | 6.20 | 1.89 | 0.33 | 1.32 | 0.14 | 0.01 | 0.00 |
| Crustaceans | 0.00 | 0.27 | 0.54 | 0.24 | 0.02 | 0.11 | 0.62 | 0.00 |
| Sciaenids | 0.00 | 2.45 | 8.80 | 9.46 | 4.60 | 4.39 | 7.94 | 5.42 |
| Cephalopods | 5.26 | 6.36 | 3.09 | 2.88 | 6.57 | 4.40 | 1.10 | 0.33 |
| Catfish | 0.00 | 0.53 | 0.62 | 0.27 | 0.03 | 0.04 | 0.06 | 0.00 |
| Elasmobranchs | 0.00 | 0.26 | 0.68 | 0.38 | 0.05 | 0.03 | 0.06 | 0.00 |
| Mackerel | 0.00 | 6.37 | 0.00 | 0.00 | 0.00 | 0.39 | 0.00 | 0.00 |
| Miscellaneous | 36.57 | 33.15 | 41.56 | 17.28 | 15.04 | 18.73 | 35.64 | 73.33 |
| Total | 58.29 | 76.89 | 65.03 | 36.17 | 31.22 | 43.53 | 53.81 | 95.67 |
| Fishing hours | 1.75 | 108.52 | 115.51 | 161.40 | 180.04 | 145.60 | 104.91 | 6.00 |

Table 3. Catch and effort data during the period (1988-93)

| Month/ Year | 1988-89 Catch (kg) | Effort (hr) | Catch/hr (kg) | 1990-91 Catch (kg) | Effort (hr) | Catch/hr (kg) | 1991-92 Catch (kg) | Effort (hr) | Catch/hr (kg) | 1992-93 Catch (kg) | Effort (hr) | Catch/hr (kg) | Total Catch (kg) | Effort (hr) | Catch/hr (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct | * | * | * | * | * | * | 102.00 | 1.75 | 58.29 | * | * | * | 102.00 | 1.75 | 58.29 |
| Nov | 2726.85 | 28.46 | 95.80 | 3260.40 | 39.00 | 83.60 | 2357.18 | 41.08 | 57.41 | * | * | * | 8344.43 | 108.52 | 76.89 |
| Dec | 5412.98 | 72.10 | 75.08 | 348.15 | 12.00 | 29.01 | 1750.37 | 31.41 | 55.73 | * | * | * | 7511.50 | 115.51 | 65.03 |
| Jan | 2049.55 | 57.25 | 35.80 | 1501.41 | 47.50 | 31.61 | 2114.89 | 46.90 | 45.90 | 172.50 | 9.75 | 17.69 | 5838.35 | 161.40 | 36.17 |
| Feb | 2688.95 | 60.25 | 44.63 | 800.05 | 29.58 | 27.05 | 1067.40 | 40.30 | 26.49 | 1065.00 | 49.81 | 21.34 | 5621.40 | 180.04 | 31.22 |
| Mar | 2381.65 | 49.00 | 48.61 | 968.10 | 32.50 | 29.79 | 1730.38 | 26.10 | 66.30 | 1257.60 | 38.00 | 33.09 | 6337.73 | 145.60 | 43.53 |
| Apr | 1297.40 | 20.00 | 64.87 | 1877.20 | 40.50 | 46.35 | 1768.00 | 30.75 | 57.50 | 702.65 | 13.66 | 51.44 | 5645.25 | 104.91 | 53.81 |
| May | 574.00 | 6.00 | 95.67 | * | * | * | * | * | * | * | * | * | 574.00 | 6.00 | 95.67 |
| Total | 17131.38 | 293.06 | 58.46 | 8755.31 | 201.08 | 43.54 | 10890.22 | 218.27 | 49.89 | 3197.75 | 111.32 | 28.73 | 39974.66 | 823.73 | 48.63 |

* No fishing operations

and May whereas that for sciaenids was high during November and February.

Depthwise catch details are presented in Table 4. All the operations were confined within the depth range of 21 to 40 m. 86% of the total fishing effort was carried out in the depth range of 21-30 m and only 14% in the depth range of 31-40 m. In the case of most varieties there was not much difference between the catch rates in the two depth ranges. The exceptions were ribbon fish, in which case higher catch rate of 12.13 kg/h was observed in the 31-40 m depth range and the economically less important fishes

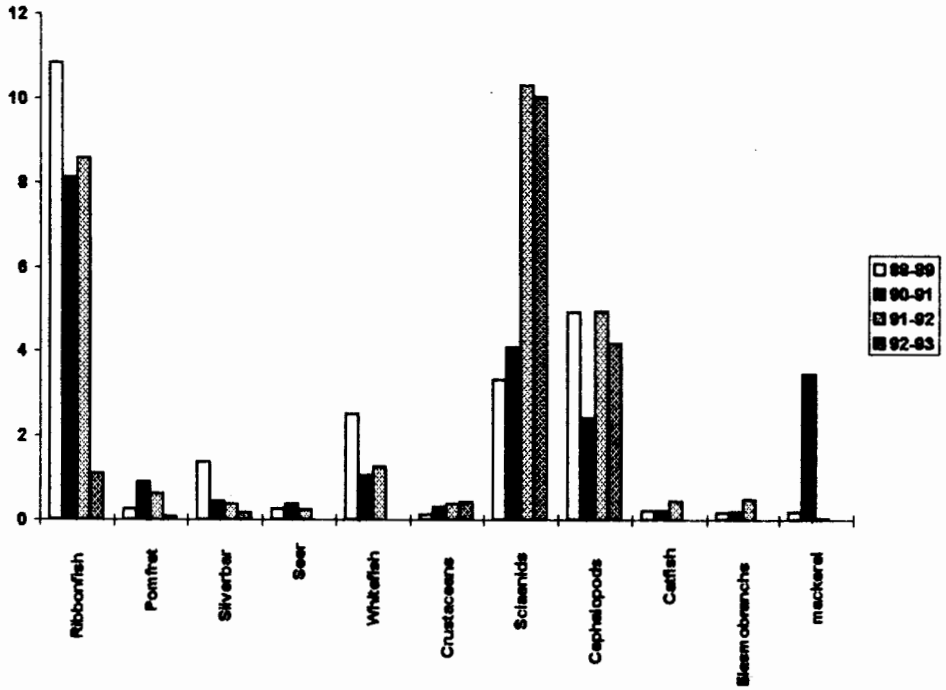


Fig. 2. Catch per hour (Kg) of major groups.

Table 4. Depthwise catch per trawling hour (Kg) for different varieties of fish during the period (1988-93)

| Catch | Depth (M) | |
|---|---|---|
| | 21-30 | 31-40 |
| Ribbonfish | 7.60 | 12.13 |
| Pomfret | 0.54 | 0.09 |
| Silverbar | 0.77 | 0.37 |
| Seer | 0.23 | 0.24 |
| Whitefish | 1.62 | 0.51 |
| Crustaceans | 0.25 | 0.31 |
| Sciaenids | 6.18 | 6.59 |
| Cephalopods | 4.04 | 5.15 |
| Catfish | 0.24 | 0.19 |
| Elasmobranchs | 0.22 | 0.25 |
| Mackerel | 0.99 | 0.44 |
| Miscellaneous | 26.25 | 19.86 |
| Total | 48.93 | 46.13 |
| Fishing hours | 705.62 | 118.11 |

which recorded higher catch rates in the 21-30 m depth rage.

From the observations made it is inferred that there is a declining trend in the catch per unit effort in the case most species available in this area and there was no significant difference in their dominance in the depth ranges covered.

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