THE FISHERY OF THE OIL SARDINE
(SARDINELLA LONGICEPS) DURING THE PAST 22 YEARS

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The annual landings of the oil sardine, *Sardinella longiceps*, in India, for the past 22 years are presented. The trends in the landings and the factors responsible for the fluctuations are discussed. The landings along the Kerala coast are found to determine the trends in the all India landings of this fish.

In India, among the fisheries that contribute to the total marine fish landings, oil sardine occupies the foremost place. This fishery is clearly marked by large fluctuations in its annual landings. Much work has been done on the biology and life history of the oil sardine, *Sardinella longiceps*. However, in earlier years the overall trends in the annual landings have not been indicated. The trends in some of the important fisheries of India by using 12 to 15 years data have been discussed earlier (Banerji and Sathyanarayana, 1958; Nair and Banerji, 1968; Rao, 1969). The present communication gives the annual landings of oil sardine as revealed by the data for the past 22 years.

Method of collection

A pilot survey was conducted by Sukhathme, Panse and Sastry (1958) to decide upon a suitable sampling scheme to estimate the marine fish landings in India. Their survey covered nearly a distance of 160 km, along the Malabar coast. It was finally established from the survey that a stratified multistage sampling would be the best suited procedure under the prevailing fishing practices in India (Sukhatme et. al., 1958). The method adopted by the Central Marine Fisheries Research Institute is based on the above procedure with some modifications here and there to suit the local conditions. This method includes the division of each maritime state into several zones containing about 20 to 30 landing centres. Within a zone, the fishing practices and intensity are more or less the same. When the fishing intensity within a zone varies considerably, the zone is again stratified according to the intensity.

The first stage unit in this sample survey is the landing centre-day or landing centre-group-day. Thus a zone with 20 landing centres, will have 20 x 30 (=600) landing centre-days in a month (of 30 days). In such cases when a group of two days are considered, there will be 20 x 30/2 (=300) landing centre-group-days. Of these, 9 centre-days are selected randomely. The second

stage units are the boat and gear combinations or the shore seine units as the case may be. Normally a boat carries only one type of net; but it is not uncommon to find different types of nets in operation at one centre by different boats. Thus depending upon the types of nets in operation, the total number of boats can be divided into 1 or 1-3 groups; each group including boats with only one type of net. A systematic sample of sampling fraction varying with the total number of units is drawn from the total number of boats that are expected to land. These sampled units are enumerated completely for the composition and weight of the catch. The length measurements of commercially important fishes like the oil sardine, the mackerel and the Bombay duck are also made from a sub-sample. The data are then processed to get estimates of the species-wise monthly marine fish landings.

Discussion

By dividing the year into four quarters, each of three months, starting from January onwards it is seen that the highest landings are in the fourth quarter i·e., from October - December. The landings in the first quarter are moderate and those in the second and third are poor (Rao, 1969). Though some shoals start appearing in the coastal waters in late May or early June the regular fishery commences from July along with the out break of the southwest monsoon (Antony Raja, 1969). It is also reported that large sized fishes in advanced stages of maturity with many small sized sardines appear in August-October, and that during the peak season which lasts from September to January, the catches are made up chiefly of juveniles from 12 to 15 cm in length. Thereafter, the fishery declines and the season gets closed by about May (Rao, 1969).

Fig. 1. gives the extent of fluctuations which this fishery has been subjected to, during the past two decades. The magnitude of fluctuations can be judged from the landings which in the poorest season formed a minimum of 1% and in the best season a maximum of 32% of the total annual marine fish landings in India. Fig. 1. reveals the prominent position Kerala occupies for this fishery. For both Kerala and the entire country, the minimum and maximum yields were recorded in the years 1956 and 1968 respectively. Fig 1. also indicates that Kerala determines the general trend for the all India landings. In those years when the fishery was good, this state contributed nearly 80% of the total landings of oil sardine. Fig 2. shows the percentage contribution of the states namely Kerala, Maharashtra, Mysore and Tamil Nadu. It is clear from this figure that of the total all India yield 37-99% are recorded from Kerala. As compared to Kerala, the yields of oil sardine in the other states where it is caught are almost insignificant. However, Mysore stands next to Kerala. The trend displayed by Mysore is somewhat similar to that of Kerala. Mysore's contribution to the all India yield of oil sardine varied from 0.4 to 47% (Fig. 2). These data indicate that a good fishery of the oil sardine
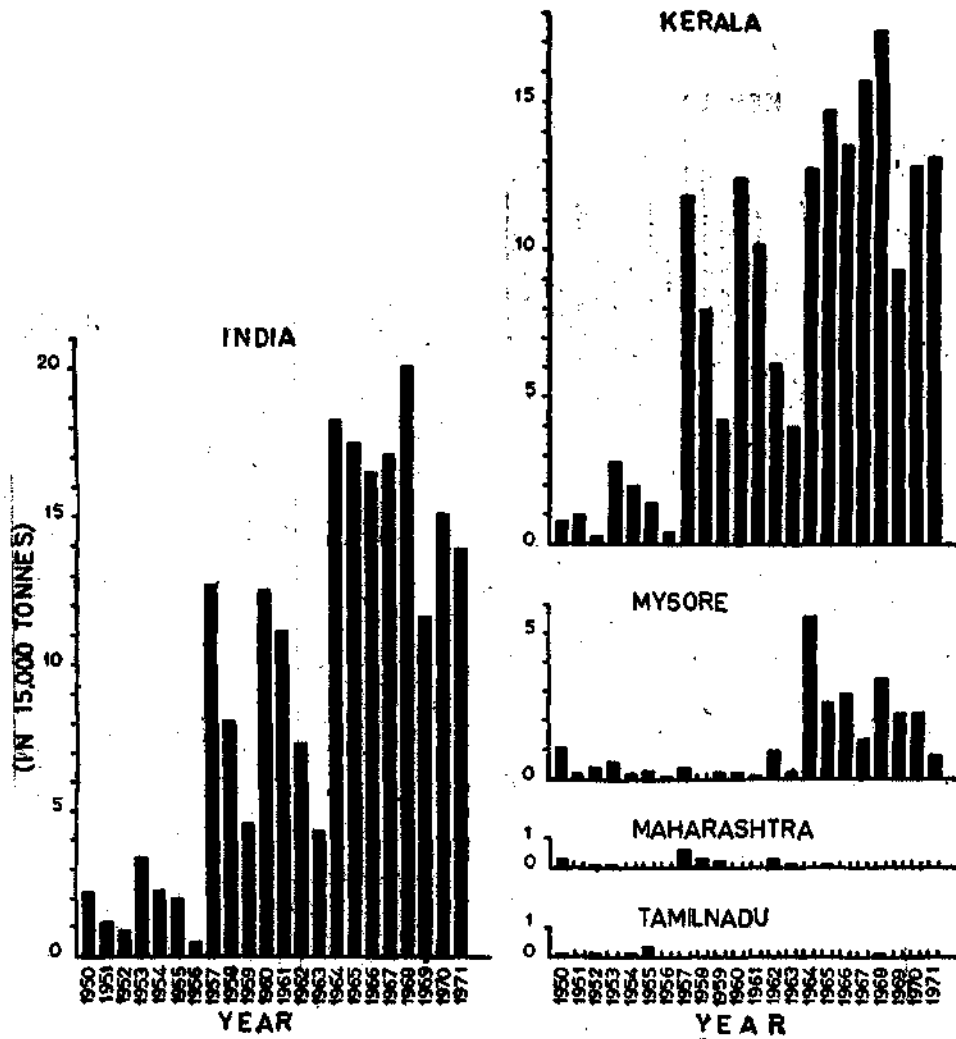
FIG. 1. Annual landings of oil sardine in India and in the coastal states where it occurs for the years 1950-71.

lies in between Quilon in the south and Ratnagiri in the north. After Ratnagiri the catches become insignificant towards the northern parts. The states of Tamil Nadu and Andhra and Andamans yield very small catches.

While the oil sardine appears in fairly large quantities in Pakistan and Bangla Desh it is absent or rarely present in Gujarat, West Bengal and Orissa.
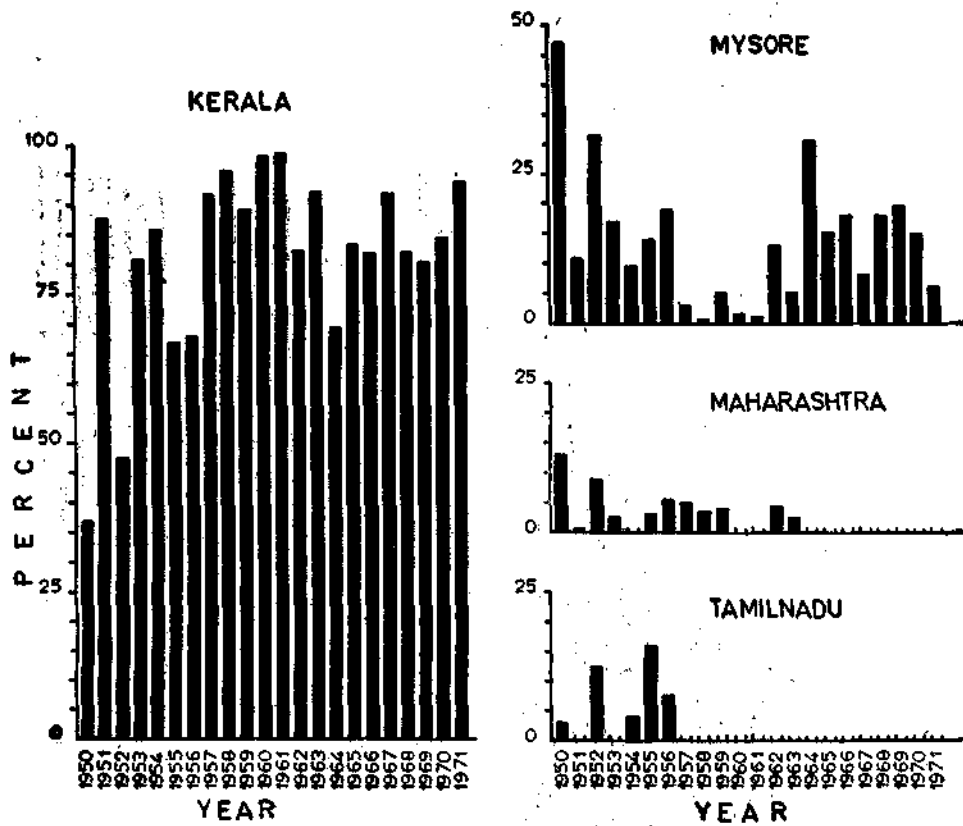
FIG. 2. Percentage contribution of different states to the all India landings of oil sardine for the years 1950-71.

Many reasons have been given to the patchy distribution of the oil sardine in the Arabian Sea and Bay of Bengal and its special preference to the west coast of India (from Ratnagiri to Quilon). A few of these explanations have been attributed to certain specific environmental factors or the availability of food. Probably a strong monsoon and the availability of food are the two main factors possibly responsible for the fish to shoal in specific areas of the Indian Ocean.

Variations in the recruitment have been indicated to cause the fluctuations in the fishery of oil sardine. But so far, it has not been possible, to determine the spawning grounds and to pin-point the causes of the seasonal inshore and off shore movements of the fish. Equally uncertain is the knowledge of its

migration along the coast. Some authors are of the opinion that its shore-ward migration is for feeding as the fish has been reported to feed voraciously on phytoplankton. Therefore, it seems likely that it keeps moving from an area as soon as the supply diminishes.

Since oil sardine is caught mainly in indigenous boats, the investment for this fishery is less, the main expenditure being for the procurement of nylon nets. This when compared to the investment on mechanisation is negligible. At the rate of 1 rupee per kg, the annual income from this fishery can be estimated at about Rs. 25 crores. Considering the very small investment, this is a significant contribution to the national income.

We are greatful to Dr. S. Z. Qasim, Director of the Institute, for sugges-ting the problem and for the critical comments on the manuscript.

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