

# Is There a Ten Year Cycle in the Mackerel Fishery ?

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## INTRODUCTION

Advance knowledge on the trends in a fishery is an essential prerequisite to its proper management. It helps to avoid waste of time, effort and money in exploitation, and evades groping in the dark playing a game of luck. Diversification of fishing, regulation of markets, toning up of utilization and profitably gearing up ancillary industries are its other benefits. However, no effective forecast in any of our fisheries has so far been done, and an attempt now made on the projection of future trends in mackerel landings is presented here.

## OBSERVATIONS AND DISCUSSION

The Indian mackerel, *Rastrelliger kanagurta* (Cuvier) constitutes a fishery of very high magnitude in the country especially on the western side in its southern Quilon-Ratnagiri Region. The fishery is supported year by year mainly by a single annually replenished age group. It exhibits considerable yearly fluctuation and is found to contribute to 2 to 20% of the total marine fish catches in different years. The season with large scale recruitment of commercial sized fish supporting the fishery

commences in August and lasts till April. The landings in a calendar year hence conjoin fish of two seasons. The period July-June embracing only one season in full and conveniently considered as a fishery year is conducive to studying the oscillations in the density of the landings in a season from the other.

The all India mackerel landings computed for the last 28 fishery years commencing from 1950-51 to 1977-78 taken from the Bulletins (CMFRI, 1969 & 1970) and the periodic scientific reports of the Central Marine Fisheries Research Institute and plotted in Fig. 1, show the oscillating tendency of this fishery. Landings for various periods at certain selected centres such as Karwar, Mangalore, Calicut (other than for the period from 1944-45 to 1955-56 extracted from Register No. F. C. 12 of Kerala State Government Fish Curing Yard at Vellayil), Cochin and Vizhinjam, likewise taken from published accounts (Banerji and Chakraborti 1962, CMFRI 1970, Venketaraman and Rao 1973 and Noble 1974) and from the reports of the Institute, also plotted in Fig. 1, produce such parallel pictures excepting

an insignificant bump at Vizhinjam in 1965-66.

The mackerel landing in India in 1950-51 season (Fig. 1) was 72,119 tonnes. In the subsequent season, the production rose to 121,186 tonnes but in the following three seasons it fell

consecutively and reached a low level of 16,329 tonnes in 1965-66. From this fall, the yield shot steeply up in 1958-59 with 142,213 tonnes and except the drop in the next season, has kept up the peak in 1960-61 with 134,776 tonnes. As in the period from 1952-53 to 1955-56, the catches in 1961-62 to 1964-65 depressed and dropped to a meagre 16,329 tonnes in 1965-66. After remaining low during 1966-67 to 1968-69 also, the landings escalated in 1969-70 and rose to the all time high of 222,488 tonnes in 1970-71 which was made up of 105,688 tonnes during July-December period of 1970 and 116,800 tonnes during January-June period of 1971 (Table 1).

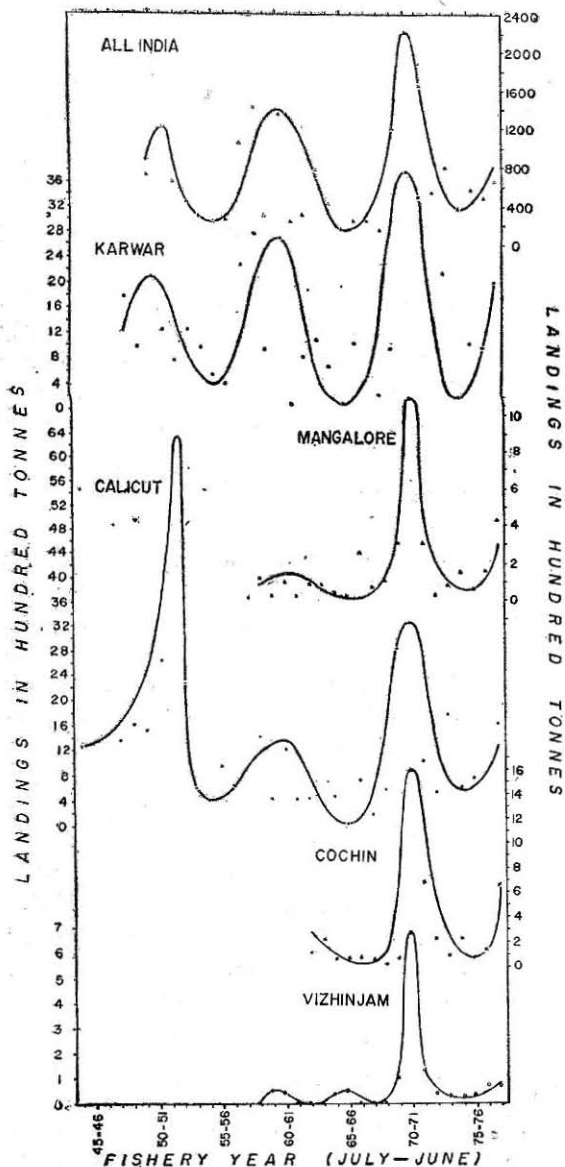


TABLE 1

Quarterwise landings of mackerel in 1970 and 1971 in tonnes.

Year	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Total
1970	25,927	7,591	11,502	94,186	139,206
1971	79,509	37,291	2,711	85,064	204,575

From the record catches of 1970-71, the landings have fallen in the next three years and touched a low value of 37,806 tonnes in 1974-75. From 1975-76 onwards the landings in the following three seasons indicate an upward trend.

The landings on the whole show wide fluctuations from season to season. But these variations broadly picture a periodically set pattern of ups and downs, the ups appearing in and or around the confluence of two decades and the downs cleaved in the middle of each one. In other words, the peaks as also the falls recur broadly after every ten years. This trend almost appearing in a rhythm for the past

three decades under consideration, aids in foretelling the long term fluctuations in future seasons. Looking from this angle, as similar trends are likely to continue, the mackerel fishery may be good at the end and or beginning of the future decades and poor in the middle of each one. In the immediate future the upward trend reflected in the catches of the past three seasons commencing from 1975-76 onwards prognosticates a good season in or near about 1980-81 fishery year.

Though it is possible to foresee the long term fluctuations in the seasons, prophesying on the magnitude of catch in a season cannot be attempted yet. However, it is worthy to note that some presage on the density of landings in a season has already been done at Karwar (Noble, 1972) where the total rainfall of a year was observed to be inversely related to the quantity of the annual mackerel landings, the catch becoming more when the rainfall is less and less when the rainfall is more. As the rainfall in a year precedes the year's mackerel fishery, it becomes a yard stick to measure the strength in the landings. But it is possible at present to foreshow the landings only in relative terms with the yester-year.

An inverse relation between the annual mackerel landings and the yearly mean values of dissolved oxygen in the surface sea-water is also observed at Karwar (Noble, 1972) where the catch is more when oxygen is  $\downarrow$  more. The low oxygen concentrations below the thermocline, which during upwelling period is very shallow, forces some of the fish species such as mackerel and sardines towards the surface, leading to an increased fish concentration in

this layer (PFP, 1976), and it has been suggested that further studies may lead to application of this data for prediction purposes in relation to the fisheries.

Apart from this, prediction on the length of the season in a year too was tried at Karwar (Noble, 1972). The duration of the mackerel fishery there seems to have an inverse relation to the occurrence of the minimum temperature in the inshore surface sea-water during the south-west monsoon period, an increase in the value coinciding with a decrease in the length of the season and vice-versa. The lowest values in the temperature were generally observed to occur in August, and an earlier or later appearance of it impinge a shorter or longer season of the fishery. The occurrence of the minimum temperature preceding the commencement of the year's mackerel season makes it possible to portend the latter as well.

Murthy (1965) suggested that the coastal drifts in winter "may possibly evolve a prediction system" for our pelagic fisheries. Rao *et al* (1973) studying on the sigma-T distribution found that the main current during the south-west monsoon and the period immediately following, is southwards in surface layers with transition afterwards, and during winter the flow becomes mainly northwards. They further suggest that the fish move along with the northward current as it produces convergent zones where zooplankters accumulate and the fish migrate to feed on them. On this line, Hardenberg (1956) says, *Rastrelliger* being a plankton feeder tend to follow highest densities of plankton, and if patches of plankton rich water move from one place to another the schools

of *Rastrelliger* will follow." Studies on the food and feeding of the mackerel show that they resort to selective feeding by discriminating the edible items of the food from the non-edible and they try to avoid the latter (Noble, 1962). Investigations by Noble (1962) further show that the cladocerans form an important item of the food next to copepods and diatoms; and probing on the association of cladoceran swarms with the onset of mackerel fishery, Selvakumar (1970) comments that there is enough reason to propose that the appearance of cladoceran swarms and their progressive movement from south to north heralds the mackerel shoals.

Further work on the fish and its abode is inevitable to evolve concrete systems for deriving advance cognizance of the trends in this fishery.

#### SUMMARY

Mackerel landings of the country

during the past 3 decades are presented and it exhibits a set pattern of recurring ups in and or around the confluence of 2 decades and downs in the middle of one. This suggests the possible prediction of similar trends in the landings in the coming decades. In the immediate future, the upward trend shown in the landings from 1975-76 onwards is the harbinger of a peak in or near about 1980-81.

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