CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
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R & D SERIES FOR MARINE FISHERY RESOURCES MANAGEMENT

1. THE INDIAN OIL-SARDINE

The Oil-sardine *Sardinella longiceps* contributes a major commercial fishery yielding about 15–20% of the total marine fish landings of India. Its fishery is characterised by remarkable and wide fluctuations both seasonal and annual. Hence its role in the economy of the fisherfolk and the fishery industry is of paramount importance. Valuable data on its fishery and biology have been collected and documented which are all of immense value for its rational exploitation and utilization.

Occurrence and distribution

It is found distributed off the coastal States from East Africa to Philippines in the Indian Ocean and Eastern Pacific. The traditional fishery of oil-sardine in India has been found restricted to a narrow strip of 3–20 km of the coastal sea. The highest abundance and large-scale shoaling have been observed off the Kerala and Karnataka States. Till about the close of seventies, the artisanal canoes and the gear *viz.*, boat-seines, shore seines, gill nets and cast nets have been employed for the fishery. But, purse seiners have been introduced during the present quinquennium off the southwest coast which ushered a new fishing strategy for large-scale exploitation of this major fishery resource. Advent of purse seiners have made the indigenous gears less productive and obsolete in Kerala and Karnataka causing a small-scale impact on the indigenous fishery.

Resource estimation

The fishery was exceptionally good during 1923–24 when its yield of oil and guano along west coast recorded 57,000 t. The fishery showed declining trend during subsequent twentytwo years. Revival in the oil-sardine fishery was observed since 1950 and the landings tremendously improved during 1964–68 with an all-time bumper yield of 3.01 lakh tonnes in 1968. Since then the production of the oil-sardine again showed a declining trend. All India percentages of oil-sardine catches in the total marine catches during 1964–'71 were remarkably above average, but were below average during 1972–'73. The decline in percentage may be attributed to the increased landings of other fishes consequent on proliferation of mechanised vessels in all maritime States.

Bulk of catches is used in the raw or frozen state. Salt curing, canning, extraction of oil and guano are done when there is glut. Its crude oil is used in paint and leather industries and for painting on wooden boats. Its meal is used as poultry and cattle feed. Guano and manure are used as fertilizer in rubber, tobacco, tea, coffee and coconut plantations; the refined vitamin-rich oil is used for human consumption and as a sardine-canning medium.

Detailed investigations have been made by this Institute since 1947 on its food, age and growth, length-weight relationship, meristic and racial aspects, reproduction, sex composition, maturation, shoaling and related behaviours, morphology, the fishery, causes of fishery fluctuations, etc. and the significant results achieved have been published from time to time. Food studies indicated that the fish feed on both plant and animal plankton. Age-studies revealed that the growth rate is rapid during the first twelve months; the highest growth noticed during the first two-three months. Scalimetric studies indicated that it attains average lengths of 14.3, 16.4 and 18.4 cm on completion of 1, 2 and 3 years respectively. The bulk of the catch is normally contributed by the 0-year and 1-year old fish (*i.e.* when they are 10–15 cm in size). Major spawning takes place during May–August.

Juveniles appear abundantly during July–September in the nearshore waters. On an average, its fecundity is about 48,000. Studies on shoals under natural conditions revealed various categories of surface and sub-surface shoals, their behaviour characteristics and distribution. A sound knowledge of behaviour traits is essential for better exploitation and for the designing of more effective gears.

The fishery fluctuations have been ascribed to be due to fishery independent factors. Recent investigations indicate that intensive fishing by the purse seiners has caused a small-scale impact on the

indigenous sardine catches and on the economy of the fishermen especially along the Kerala Coast, since 1980.

The all-India annual catch is estimated as 1.8 lakh tonnes. Recent studies at the Institute on growth and mortality of the fish indicated that its asymptotic length (1∞) is 22.5 cm and the growth co-efficient k is 0.75. The instantaneous fishing mortality is estimated as 0.68. The average annual stock is around 6.4 lakh tonnes. The potential yield works out to 4.4 lakh tonnes. In Kerala State, there appears to be scope for increasing the fishing effort for augmenting the catches; however, the consequent socio-economic implications will have to be examined.

Monitoring

The mesh regulations of purse seines have to be strictly enforced with the view to protect the young sardine. The capture of gravid fishes has to be restricted, for conservation of the resource. Infra-structural facilities such as adequate cold storage, curing salt, ice supply, fish storage and curing-sheds, fresh-water supply and transport facilities have to be provided to manage bumper catches.

Since there have been violent clashes at sea between purse seiners and artisanal fishing units, it is *recommended* that (1) the former should adhere to the Marine Fishing Regulation Act of Kerala (Patrolling against poaching has to be intensified and mesh regulations have to be promulgated for conservation of the resource), (2) that the purse seiners should refrain from intensive and indiscriminate fishing to ensure resource conservation and (3) if feasible, a season-wise catch quota may be insisted among purse seiners, as temporary measure.

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The conclusions/recommendations made in this series are subject to revision with addition of further information on the resource.

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