FISHERIES OF THE WEST COAST OF INDIA

Published on the occasion of the opening of the new building of the Central Marine Fisheries Research Sub-Station at Calicut by Shri. M. V. Krishnappa, Union Deputy Minister for Agriculture, on 1st October 1958

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SOLE FISHERIES

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THE sole fishery is one of the major fisheries of the west coast of India and it enjoys considerable local importance. The fishery is limited almost exclusively to the Kerala and South Kanara zones with an active area extending from Moolki in the north to Alleppey–Purakkad in the south. Soles are locally known as *nangu* in the northern centres and as *manthal* in the south and being a comparatively inexpensive fish, they are consumed in the fresh and cured states mostly by people of low income.

The important sole-fishing centres are Baikampady, Ullal, Kanhangad, Hosdurg, Cannanore, Tellicherry, Quilandy, Calicut, Chowgat., Ponnani, Narakkal and Alleppey–Purakkad. Although the fishery is subject to large fluctuations in the annual yield, a moderate quantity of soles is always available in the boat-seine catches, almost throughout the post-monsoon season, and at most of the centres of this coast. Like catfishes, the fish is preferred for consumption more in the cured state than in the fresh condition.

The species that contributes most to the commercial fishery is *Cynoglossus semifasciatus* Day or *vala manthal* as it is commonly known on the Malabar coast. A small but distinct fishery is contributed by the larger species, *Cynoglossus dubius*, locally known as *pada manthal*. Other species such as *C. puncticeps*, *C. lida* and *C. bilineatus* also occur in the catches, but do not constitute independent fisheries. The soles of our coasts are smaller in size as compared to species common in Europe. *Cynoglossus semifasciatus* grows to about 17 cm., but the commercial fishery is composed of specimens of the 10–13 cm. group. *C. dubius* occurring in the commercial fishery have sizes above 25 cm. and specimens as large as 45 cm., have been obtained from Quilandy and Narakkal during the post-monsoon season. Since the soles are small-sized fishes, they are always sold in bulk by weight and not by numbers as in the case of sardines or mackerel. The sole fishery season commences all along the coast soon after the south-west monsoon, by late August or early September and the active season extends up to November. Soles continue to be obtained in

moderate quantities as the chief constituent of boat-seine catches, the landings of this gear including also smaller sciaenids and miscellaneous fish.

The common types of gear used in sole-fishing operations are the shore-seines (*noona vala*), boat-seines (*paithu vala*), and cast nets (*veechu vala* or *beesu bala*) operated from canoes. The shore-seines are employed in Narakkal and nearby southern centres; cast nets operated from canoes are efficiently used in the Kanara zone. The boat-seines are in extensive use in the Malabar area and form the most popular and efficient gear for sole fishing in comparison to other gear. The boat-seines are operated from two dugout canoes each measuring about 8–10 metres in length, and employing about five to nine persons in each boat. The bag portion of the net has comparatively smaller mesh and the mesh-size increases towards the outer ends. Weights are attached to the edges to make the net sweep along the bottom during fishing for soles or prawns. The area of operation is seldom beyond the seven fathom zone and, during the active part of the season, catches are made quite close to the shore.

One of the special features of the sole fishery is that the major part of the total landings for the year is obtained within the first few weeks of commencement of the season. There is no case of warming up of the fishery as has been noticed in the case of others. Large shoals appear at certain centres quite suddenly without any previous indication and fishermen have to use all the resources at their command and employ all odd combinations of gear to net as much fish as possible. It is only during the commencing weeks of the fishery in August to September, that shoals appear at the surface or in midwater and could be fished soon after sighting of the shoreward moving shoals. During the remaining part of the year, availability of soles in a particular area could be judged only by trial fishing at different depths.

The soles are bottom feeders. They feed actively on polychætes, smaller bivalves, amphipods, cumaceans and other small and soft-bodied animals of the sea bottom. The food consumed by the soles is, within certain limits, related to the nature and amount of bottom organisms available in the different areas in the different seasons. A comparative investigation on the food and feeding habits of the soles in the different sole-fishing centres in the different seasons was undertaken with special reference to the nature of the bottom organisms and their state of colonisation. These studies indicated three distinct food-type areas, a polychæte dominant *Quilandy-type*, a bivalve dominant *Tellicherry-type* and a *mixed-type*. Although all these three food-type areas are favoured by soles, as evidenced

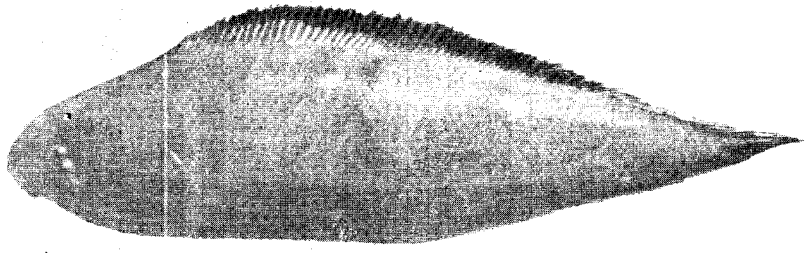
by their large-scale occurrence in these centres in the different years, the fishery is found to be at its best in the *Quilandy-type* centres which have a predominantly muddy bottom. The physical factors appear to play a greater part in producing this result than the biological factors.

The fishes that contribute to the fishery during August and September are the prespawners and fully mature specimens are obtained only during late October and November. Sole eggs start appearing in the plankton from October. The larvæ which hatch out from the eggs, grow and metamorphose into the young ones which appear in the fishery from January onwards. These very small soles, locally known as *podimanthal* if left uncaptured, would attain the commercial size and enter the fishery after the next monsoon season. But a good quantity of the very young soles are captured and removed from the inshore grounds during the hot months when boat-seines are operated for miscellaneous fishes. There is already some suspicion that owing to indiscriminate fishing of the young ones and prespawners, depletion is taking place in the sole fishery, although we do not have adequate data at the present, to support or deny this assumption.

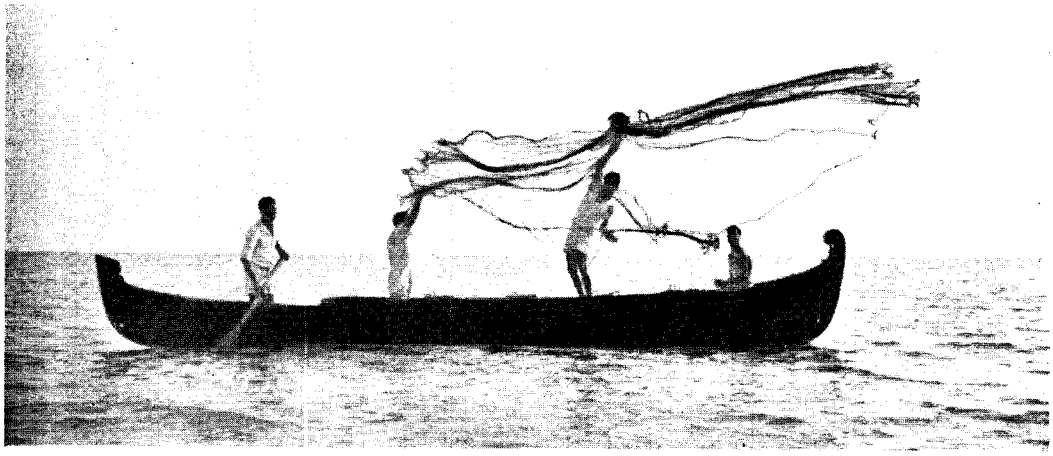
Soles disappear almost completely from the inshore waters with the onset of the south-west monsoon. They are dislodged from the inshore zone perhaps by the disturbances in the sea-bottom caused by stormy weather or by the formation and dissolution of mud banks. Disappearance of the soles and destruction of benthic organisms in the foreshore areas are noticed every year during the earliest weeks of the monsoon. As soon as the vigour of the monsoon is over soles return in large shoals. This phenomenon of reappearance of the fish in enormous numbers in midwater and in surface water is known among fisherfolk as "*manthayilakom*" and it is always accompanied by their large-scale capture. The factors contributing to this sudden and large-scale migration shorewards are not yet fully understood, owing to absence of adequate data on the behaviour of the shoals in the offshore areas during the monsoon season. The settling of the bottom-mud after agitation during the monsoon, and the rapid increase in temperature and salinity from the very low levels they had reached during the monsoon, might perhaps act as stimuli causing the return of the soles. It has always been found that the first report of shoals being sighted is obtained when the rains have stopped and sunshine prevails for a day or two. During such days veteran fishermen confidently look forward to hearing that shoals had been sighted by scouts. It seems unlikely that the food factor provides the inducement for the return of the soles at this stage, since at most places the bottom fauna have not started recolonising the area by this time, although the mud has, more or less, settled.

Soles obtained on the west coast are in great part, either cured or sun-dried and sent to inland centres. Dried soles are sold in the northern markets almost throughout the year, the price varying from seven rupees to twelve rupees a maund depending on the season. Soles are usually sun-dried on the open beach on coir matting without either gutting or salting although at certain centres they are kept lightly salted for a few hours before drying in the sun. The products are known to keep long perhaps on account of the poor fat content of the fish.

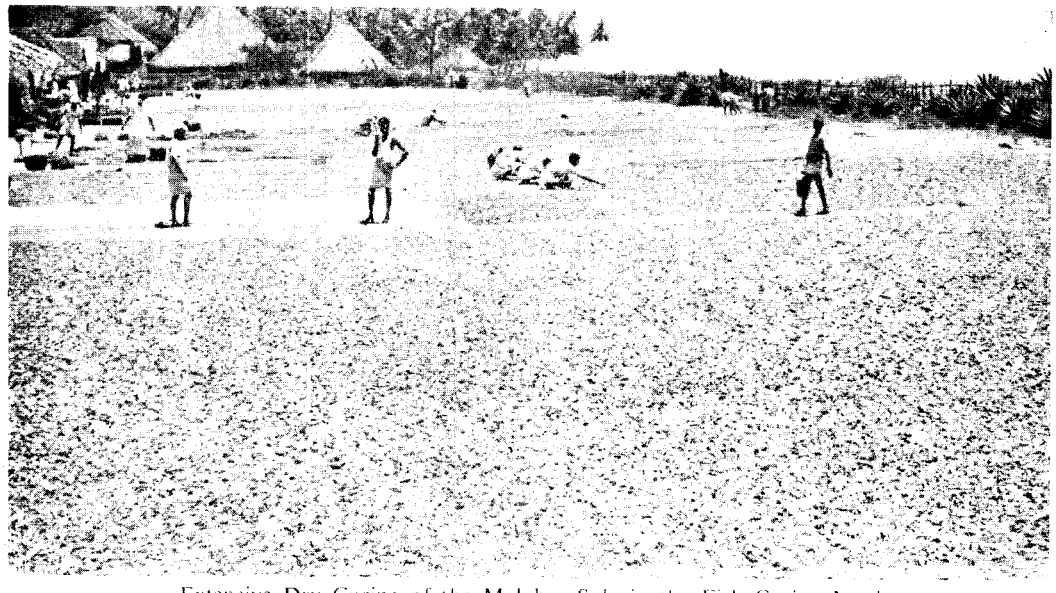
It has been found that the presence of large shoals at one centre is independent of the fishery at the adjacent centres. During the first week of September in 1956, it was estimated that about 1866 metric tons of soles were landed at Badagara near Tellicherry in Malabar, but there was little indication of an active fishery at the adjacent Calicut or Cannanore centres. Since the major part of the catches of the year is landed within the first few weeks of the commencement of the fishery, the fishing industry often finds it difficult to cope with the huge catches landed without advance indication. The uncertain weather conditions prevailing during August and September, with intermittent days of rain and sunshine, make sun-drying and curing difficult and uneconomical. Consequently, on most occasions, the large catches have to be diverted for use as manure, owing to the lack of modern and scientific methods for storing the fish or curing it.



The Malabar Sole, *Cynoglossus semifasciatus* Day



Cast Net Operation for the Malabar Sole



Extensive Dry Curing of the Malabar Sole in the Fish Curing Yard