

NOTES

FOOD OF THE OIL SARDINE TAKEN BY BOTTOM NETS AND SURFACE GILL NET IN THE MANGALORE AREA

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The food of the oil sardine, *Sardinella longiceps* Val., caught off Mangalore by gear operating in the upper layers and close to the sea floor was studied. Fish obtained from the surface gill net showed poor feeding and the food consisted mainly of *Coscinodiscus*, a typical diatom of the upper layers. On the other hand, fish from bottom gill nets and trawl nets had gorged stomachs and the food item comprised mainly, in some cases exclusively, either *Pleurosigma* or *Ornithocercus* which are typical bottom-dwelling forms. It is suggested that the oil sardine occasionally resorts to a demersal habitat.

The Indian oil sardine, *Sardinella longiceps* Val., is mainly a surface feeder, its food consisting chiefly of diatoms, dinoflagellates and, to a lesser extent, zooplankters (Nair, 1953; Dhulkhed, 1962; Bensam, 1964 and Kagwade, 1964). Investigations in the past were based on the samples collected from the cast net, boat-seines and surface gill nets which are operated in the inshore waters, their operational range varying from 1 to 5 metres depth.

At Ullal (near Mangalore), a bottom gill net, locally known as 'kanthabale' (mesh size 5 cm), is operated in depth ranging 10-20 m for the bigger varieties of fishes. When the net is not properly set, occasionally a few oil sardine get entangled (Sekharan and Dhulkhed, 1963). Oil sardine caught this way were available for studies during the last week of March 1963 and 1964. The trawlers operating off Mangalore in the region of 10-25 m depth occasionally caught oil sardine towards the end of March 1968 and 1971 and also during the beginning of April 1971. The number of oil sardine that could be examined was necessarily restricted owing to the limited availability of the fish from these nets. A comparative study of food of oil sardine taken from these two types of gear with those caught by 'chalabale' a surface gill net, during the same months was made.

TABLE 1. *Various food items and displacement volume of stomach of oil sardine in relation to gear and size range*

Month and year	Gear	No. of specimens examined	Size range of oil sardine (mm)	Displacement volume of stomach (ml) range	Food items						
					<i>Pleurosigma</i>	<i>Coscinodiscus</i>	<i>Biddulphia</i>	<i>Diplonella</i>	<i>Ornithocercus</i>	<i>Dinophysis</i>	Copepods
March 1963	<i>Kanthabale</i>	8	140-178	1.3-2.1	99.7	0.3	..	..	..	..	..
March 1964	"	5	163-184	0.8-1.2	2.2	..	..	..	97.0	0.8	..
March 1964	<i>Chalabale</i>	6	160-182	0-1.0	30.8	69.2	..	..	..	0.01	..
March 1968	Trawl net	5	148-175	1.1-2.0	97.9	1.8	0.3	..	..	..	..
March 1971	"	14	155-194	0.8-2.5	98.9	1.0	..	..	0.5	..	0.5
March 1971	<i>Chalabale</i>	7	141-169	0-0.1	48.0	34.0	18.0
April 1971	Trawl net	7	145-172	0.4-2.9	77.0	16.8	2.6	1.4	0.3	..	1.9

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The volume of stomach content was determined by the displacement method. In cases where the stomach was gorged, the gut content was made up to a known volume (100 ml) and whenever the food was found to be dense, a sub-sample of this was taken and further diluted. An aliquot of 1 ml was taken and spread over a counting chamber. The number method (Hynes, 1950) was followed for the estimation of relative abundance of various items of food. The value of each item of food was calculated in terms of percentages (Table 1).

Oil sardine caught by 'kanthabale' and trawl net had gorged stomachs; in certain cases the stomachs were on the verge of rupture (Fig. 1A). The displacement volume varied from 0.4 to 2.9 ml. On the other hand, in most of the specimens examined from 'chalabale', the stomachs were either empty or contained detritus (Fig. 1B).

It is seen from Table 1 that in most of the years with exception of 1964, *Pleurosigma* sp. (Fig. 1C) constituted the chief item of food of oil sardine taken from trawl net and bottom gill net and its percentage varied from 77.0 to as high as 99.7. However, in 1964 the oil sardine caught by 'kanthabale'

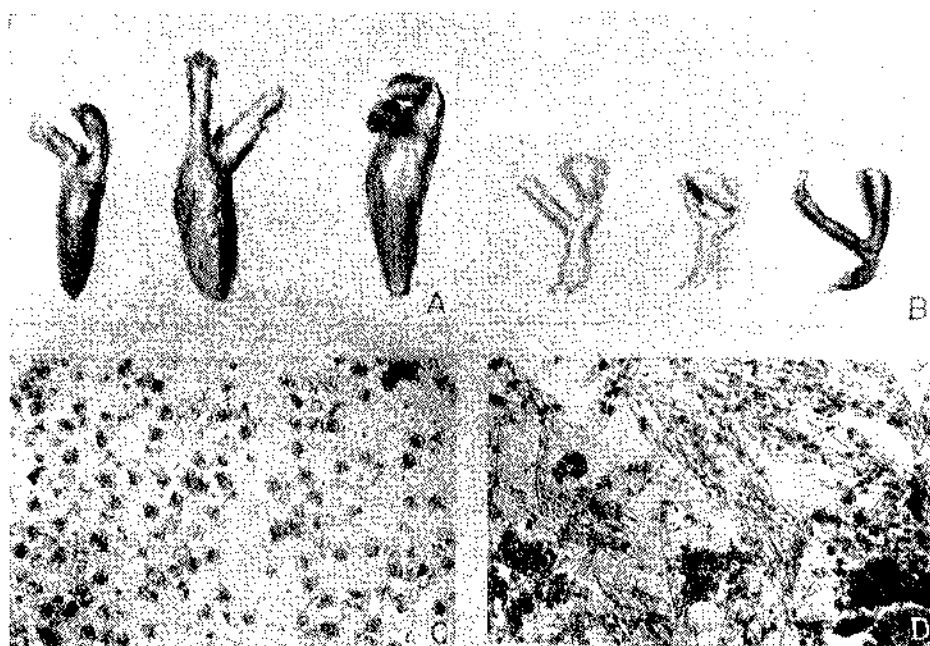


Fig. 1. A. Gorged stomach of oil sardine of length 173, 186 and 192 mm from trawl net; B. Poorly fed stomachs of oil sardine of length 145, 155 and 174 mm from surface gill net; C. Gut contents of oil sardine from bottom nets showing exclusive feeding on *Ornithocercus*; D. Gut contents of oil sardine from bottom nets showing exclusive feeding on *Pleurosigma*.

had fed almost exclusively on a dinoflagellate, *Ornithocercus* (Fig. 1D). Zooplankters (copepods) were noticed to a negligible extent in the diet of oil sardine in all the years.

However, what is of great interest is the difference in the gut contents of fish taken from the surface waters and close to the sea floor. In fish from bottom nets ('kanthabale' and trawl net) the main item of food was *Pleurosigma* or *Ornithocercus*. These it may be noted, are typical bottom dwelling forms. In the gut of fish from surface gill net, on the other hand, *Coscinodiscus*, a typical diatom of the upper layers of water, formed an important item of food. Thus, it would appear that fish collected from different levels have been feeding on the species of diatoms or dinoflagellates which were dominant at the respective layers. The occurrence of *Pleurosigma* or *Ornithocercus* in the bottom layers may be due to the decrease in the viscosity of surface waters consequent on the increase in the temperature and also to the condition of optimum light (Subrahmanyam, 1959 and Raymount, 1963). The intensity of grazing as evidenced by the occurrence of single species of phytoplankton in the stomach of oil sardine caught in 10-20 m depth indicates that very rich feeding grounds exist at these depths. The observations also indicate that the oil sardine occasionally resorts to a demersal habitat. More observations on this line would be interesting.

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