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Paper 6

FISHERY AND BIOLOGY OF OIL SARDINE *SARDINELLA LONGICEPS* (VALENCIENNES) FROM COASTAL WATERS OF PARANGIPETTAI

K. Kumar and K. Balasubrahmanyan
Centre of Advanced Study in Marine Biology, Annamalai University
Parangipettai 608502

ABSTRACT

Although oil-sardine fishery is a major fishery on the west coast, it is a minor fishery in some places on the east coast. Information about *Sardinella longiceps* (valenciennes) on the east coast is scanty and the total catch landed at Parangipettai was about 79.95 tonnes from October 1985 to September 1986. Oil-sardine fishery was dominant in Parangipettai during July 1986 to September .86 amounting to about 70.5 tonnes. The length ranged from 102 to 103 mm in total length and nearly 60% of the catch comprised of fish above 150 mm in length. The size at first maturity was 156 mm for females and 158.5 mm for males and spawning was found to occur from July 1986 to September '86. A comprehensive study of the occurrence and biology of oil-sardine, *S longiceps* on the east coast is needed to assess the resource potential.

INTRODUCTION

Marine fisheries play an important role in the national economy of our country. The annual catch for 1984-'85 consisted of 1,614,922 tonnes and the oil sardine, *Sardinella longiceps* (Valenciennes) is one of the major marine resources contributing to about 20% of the total marine catches. Oil sardine is a major fishery on the west coast restricted to Kerala and Karnataka states. Several studies have been made on the oil-sardine fisheries on the west coast. Only recently occurrence of oil-sardine in good numbers have been reported from the east coast (Gnanamuthu and Girijavallabhan, 1984; Ramasomayajulu and Dhana Raju, 1985; Srinivasarengan and Chidambaram, 1985). The present paper presents an account of the oil-sardine fishery in the coastal waters of Parangipettai during 1985-'86.

MATERIAL AND METHOD

Specimens of *Sardinella longiceps* (Val.) used in the present study were collected twice in a week from the fish landing centre at Parangipettai for one year from October 1985 to September 1986. Total length of the fishes were recorded in mm from the tip of the snout to the longest ray of caudal fin. Sex, maturity stages and weight were also noted. The stomach contents were analysed by "points method" (Hynes, 1950) based on formalin preserved samples For studying the maturation and spawning of *S. longiceps*, the size of the gonad in relation to body cavity, the general appearance, colouration, stage of maturity and weight were noted.

FISHERY

The total marine fish production during 1984-'85 was estimated at 1,614,922 tonnes of which the Indian oil sardine, *Sardinella longiceps* (Velenciennes) contribute about 1,65,000 tonnes. Srinivasarengan and Chidambaram (1985) reported an unusual landing of 57 tonnes at Pondicherry during October '83 to December '83. Oil-sardine is also caught in

TABLE 1.

Monthly landings of oil-sardine at parangipettai from October 1985 to September 1986.

Months	Landings in tonnes
October '85 ...	1.25
November '85 ...	0.80
December '85	0.50
January '86 ...	0.30
February '86 ...	0.30
March '86 ...	0.40
April '86 ...	0.50
May '86 ...	0.90
June '86 ...	4.50
July '86 ...	19.50
August '86 ...	30.00
September '86 ...	21.00
	79.95

good quantities from Parangipettai and the total catch landed was about 79.95 tonnes from October 1985 to September 1986. (Table 1). Parangipettai fish landing Centre has 7 fishing villages namely Mudasodai, Annankoil, Parangipettai, Chinnoor South, Chinnoor North, Pudupettai and Puthukuppam and the craft engaged in oil sardine fishery was 'Catamarans', dug-out canoes and trawlers. Bottom-set gill nets (mesh size 2.5 to 4 cm) like *"Kavala valai"* and *"Salangai Valai"* are mainly employed for catching the oil sardine. Cast nets locally known as "Veechu valai" of varying mesh size are operated from dug-out canoe. The shoals of oil-sardine occurred at a depth of 10 meters in the inshore waters.

FOOD AND FEEDING

The food of *S. longiceps* consisted of 14 items. *Coscinodisus* sp. was always dominant and ranged from 17.26% to 44.82% in all size groups followed by *Pleurosigma* sp. and *Biddulphia* sp. in the order of abundance *Fragillaria oceanica* was less in the gut of fishes from parangipettai waters. Copepods, crustacean pieces, Tintinnids, bivalve larvae, *Lucifer*, *Evadne* sp. and zoea also occurred. Copepods formed the principal food of the juveniles. In the 101-105 mm size groups, Copepods formed 28 66% but in 146-150 mm size group, the copepods contributed only 12.44% and less in higher groups.

LENGTH - WEIGHT RELATIONSHIP

Length-weight relationships in *S. longiceps* were studied by applying the formula log W= a + n log L. where,

W = weight' L = length

a = multiplying constant

n = exponent of length.

In the present study on 25 Indeterminates, 150 males and 185 females, the relationship was found to be:

Indeterminates: log W = - .8256 + 3.8056 log L.

Males: log W = -2.3645 + 3.1516 log L.

Females: log W = -3.0024 + 3.4436 log L.

The regression equation of males, females and indeterminates were subjected to analysis of covariance (F. test) to find the significance between the regression co-efficient. The data subjected for analysis of variance showed no variation between Male and Female, Female and Indeterminates, Male and Female & Indeterminates. Since there was no variation between male, female and indeterminates, the data have been pooled together and a common equation was derived.

log W = -3 2415 + 3.5505 log L.

SEX RATIO AND SPAWNING

648 specimens were examined and the ratio of males and females is 1.00 : 1.01. Sex ratio calculated for various months showed it has deviated slightly from the expected ratio 1 : 1.

Sex could be identified in specimens on attaining the length above 115 to 120 mm. Males were found to mature at 135-140 mm and females at 130-135 mm size. Maturity curve showed that 50% of females attained maturity at 156 mm and males at 158.5 mm.

PERIOD OF SPAWNING

The changes in gonado-somatic index were calculated for males and females and monthly average of gonado-somatic index (G. S. I.) is given in Fig. 1. High G. S. I. values of July-September indicate the spawning months of *S. longiceps*. The decrease in G. S. I. value in other months viz., from October to December may be due to spent condition in the fish during this period.

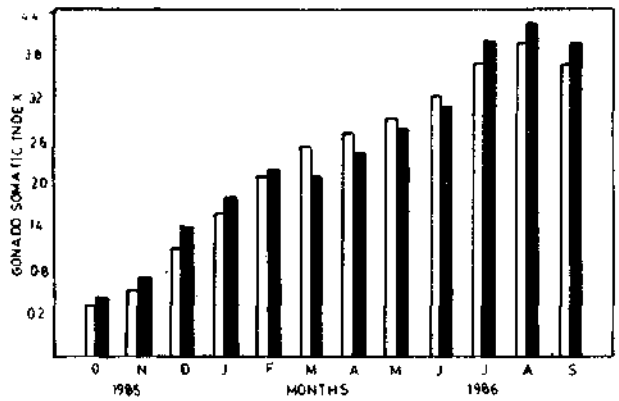

Fig. 1. Monthly average of gonado-somatic index of *Sardinella longiceps*.

DISCUSSION

The oil sardine, *Sardinella longiceps* forms a good fishery in west coast of India. Gnanamuthu and Girijavallabhan (1984), Ramasomayajulu and Dhana Raju (1985) and Srinivasarengan and Chidambaram (1985) reported about the occurrence of oil sardine from east coast also. Oil sardine regularly caught in Parangipettai and about 79.95 landed in 1985-'86.

In the present study, *Sardinella longiceps* showed preference of feeding exclusively on planktonic diatoms. This observation is similar to findings reported in Trivandrum (John and Menon, 1942), Calicut (Hornell and Nayudu, 1924; Nair, 1953; Venkataraman, 1961), Mangalore Dhulkhed, 1964) and Karwar (Noble, 1969). According to Nair (1953), Dhulkhed (1964) and Kagwade (1967), among the different diatoms found in the dietary of the oil sardine, *Fragillaria oceanica* Cleve formed the most important constituent and they found the existence of a significant correlation between the occurrence of this diatom and the oil-sardine. However, in the present study *F. oceanica* was less in the gut contents of *S. longiceps* at Parangipettai waters. Bensam (1967) found that the juveniles of oil sardine feed mainly on zooplankton diet while the adults feed mostly on phytoplankton. In the present study also, the juveniles have fed more on zooplanktonic diet than on phytoplankton.

Hornell and Nayudu (1924) reported that oil sardine attained first maturity at the age of one year when they measured about 150 mm in length and this has been confirmed by other workers (Chidambaram and Venkataraman, 1946). Dhulkhed (1967) considered 160 mm as the minimum size at first maturity while Antony Raja (1967) reported it to be around 150-160 mm which is in agreement with the present study.

The spawning season of oil sardine has been variously recorded by several workers as May to August (Hornell and Nayudu, 1924), June to October (Antony Raja, 1967, '69), June to September (Nair, 1953; Dhulkhed, 1967) and June to December (Prabhu and Dulkhed, 1967). Gnanamuthu and Girijavallabhan (1984) reported that the mature oil sardine occurred from January to March in Madras waters. In the present study, spawning season of *S. longiceps* in Parangipettai waters was from July to September.

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