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44 OYSTER RESOURCES OF KARWAR

N. Ramachandran
Central Marine Fisheries Researcfi institute, Cociin-682031

ABSTRACT

Studies on the distribution and abundance of edible oysters from Chendia to Mejali along the Karwar coast in 1984 have shown that the resources conDprising of *Saccostrea cucullata* and *Crassostrea madrasensis,* predominantly the former, were present in sheltered regions namely the Chendia creek and Kailnadi estuary, but ware absent in the intertidal zone along the coast. The distribution of these species in the Kaiinadi estuary was isolated in patches from Sadashivgad upstream to Hotegali while it was scattered in the entire Chendia creek area. The exploitation of oyster in both the places was poor during the period of study.

INTRODUCTION

Oyster IS one of the important edible moilu-scs at and around Karwar in Karnataka. Earlier works on oyster resources and fishing in this region by Patil (1592), Alagarswami and Narasimham (1973) and Nair et al (1984) are based on surveys particularly of the Kaiinadi. Information hitherto published on the distribut-ion and abundance of edible oysters of this area is meagre.

MATERIAL AND IMiETHODS

The Karwar coast extending from Chendia to Majali (Fig 1) was surveyed for the occurrence and abundance of edible oysters. The areas surveyed included Kaiinadi, Chendia creek and the intertidal zone along the coast. Oyster samples were collected with a square quadrat frame (20 cm x 20 cm or 0.5 m x 0.5 *m),* grab or a dredge. The number of oysters in a unit area was recorded from which the number/m^ and the number/oyster bed were calculated. Oysters which could be removed from the substratum without any damage, were used for further analysis. Shell length, total weight, shell weight, meat weight, sex and stage of gonadal maturity were recorded. The temperature, salinity and the dissolved oxygen content of water samples collected from near the bottom close to the oyster beds were measured.

RESULTS

The study conducted along the Karwar coast extending from Chendia to Majali showed that oysters were available in the Kaiinadi estuary and the Chendia creek and were very rare in the intertidal region along the coast.

The distribution of oysters in the Kaiinadi estuary showed concentration of oyster populat-"ons as small beds at five different locations, 1. to 5 (Fig. 1). Of the five oyster beds, the first one, along the northern bank from Sadashi-

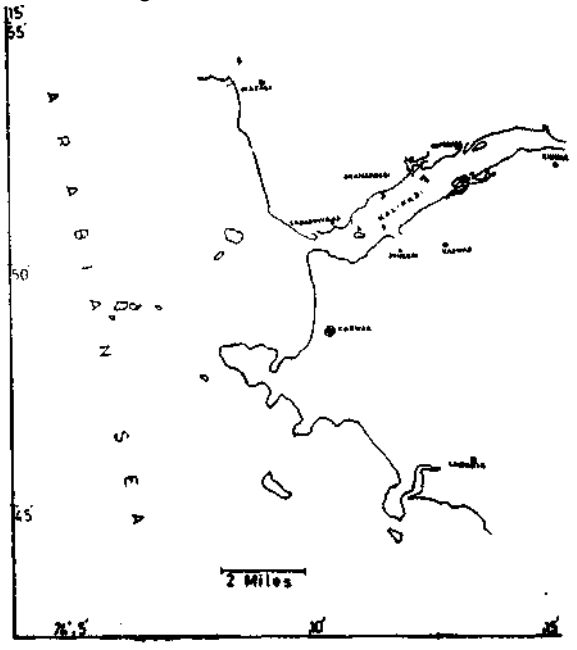

Fig. 1. Map of the Kalinadi estuary

yggd to Kanasgeri covering an area of about 2OO sq. m, had only one species, namely, *Saccostera cucullata* attached to rocks from the high water mark to a depth of 0.5 m.

"^^^ second bed, whose extent in area was about 5,000 sq. m, was found midstream about 100 m away from the first one along the northern bank between Sadashivgad and Kanasgeri. It was composed of a mixed population of *Saccostrea cucullata* and *Crassostrea madrasensis* attached to shells and shell fragments.

The third one approximalely 15 sq. m in area was located east of Kanasgeri on the northern bank in an area with mangrove vegetation. Interestingly, the mangrove roots which get exposed during low tide formed the substratum for S. *cucullata.*

S. cucullata was also found on patches of intertidal rocks around a small island in the middle of the estuary west of Hotegali and the area of this bed was about 1 5 sq.m.

The last of the oyster beds comprising of a mixed population of S. *cucullata* and C. *madrasensis* was found about 50m from the southern bank between Sunkeri and Kadwad. This was located at a depth of just less than 1 m during low tide. Shells and shell fragments provided the substratum and the extent of this bed was about 1250 sq. m.

On the other hand in the Chendia creek, the distribution of *S. cucullata* and C. *madrasensis* was scattered throughout the intertidal and submerged areas where depth did not exceed 1m during low tide. Shells and rocks formed the substratum and the area was about 20,000 sq.m.

The abundance of each species along with the biological characteristics of oysters and hydrographic parameters are given in Table 1.

TABLE 1. *Biological charactaristics of oysters, abundance and hydrological parameters in Kalinadi Estuary and Chendia creels*

Stations	Kalinadi					Chendia
	1	2	3	4	5	creek
S. *cuculatta*						
Mean shell height (mm)	29.6	34.0	33.3	29.8	33.7	27.8
Mean total weight (g)	5.7	9.1	9.0	6.9	9 4	5.2
% shell weight	81.1	80.9	77.9	76.64	81.12	75.53
% Flesh weight	16.4	9.8	10.0	12.9	12.4	13.3
Sex ratio (M.F)	1:1.2	1:1	1:1	1:0.7	1:1.3	1:09
Stage of maturity		Maturing				Maturing
Number per m^	75	12	150	75	16	20
Estimated number of oyster per bed	15,000	60,000	2,250	1,125	20,000	400,000
Estimated quantity of oysters (kg)	85	547	20	8	189	2,092
C. *madrasensis*						
Mean shell height (mm)	—	72.5	—	—	32	39
Mean total weight (g)	—	106.5	—	—	5.5	13.25
% shell weight	—	84.0	—	—	81.8	75 5
% Flesh weight	—	12.4	—	—	9.9	9.4
Sex ratio (M:F)	—	1:1	—	—	0.1	1:1
Stage of maturity	—	Maturing	—	—	Maturing	Maturing
Number per m^	—	0.7	—	—	0.4	0.5
Estimated number of oysters per bed	—	3,333	—	—	500	10,667
Estimated quantity of oysters (kg)	—	362	—	—	3	141
Temperature (°C)	31	31	—	—	31	30
Salinity (7„J	31.6	31.8	—	—	30.9	31.2
Dissolved oxygen (ml/1)	3.87	4.40	—	—	4.58	4 26

DISCUSSION

Study of the oyster resources of the Karwar coast between Chendia and Majali has shown that though their concentration in the intertidal region along the seashore was very sparse, S, *cucullata* and C. *madrasensis* occurred in abundance in the Kalinadi estuary and the Chtndia creek.

In the Kalinadi estuary, of the five locations where concentrations of edible oysters were encountered, *C. madrasensis* was found only in two, 2 and 5 (Fig 1), both remaining submerged throughout the year. Though rocks, shells and shell fragments served as substrata in most of the sites, materials of biogenic origin, that is, roots of the mangrove vegetation exclusively formed the substratum for one settlement in the nothern bank east of Kanasgeri. It is significant to note that the concentration of oysters was higher on the organic substratum than on rocks or shells. It is likely that oysters show greater preference to the live and growing roots placed perpendicular to the plank of movement of the water during the rising and ebbing tides than other types of dead substrata at the bottom or on the banks of the estuary.

The distribution and density of oyster populations appear to be dependent on the availability of suitable substrata, preferably stable ones. The absence of oyster settlements beyond Hotegali during the present study may be due to many factors, one of them being the absence of suitable substratum eventhough Nair et al (1984) reported the occurrence of oysters upto Kinnar situated further upstream from Hotegali.

It may be noted that in the Kalinadi estuary the oyster settlements at sites marked 1, 3 and 4 (Figl) which get exposed and submerged with the alternating tides were more dense than those remaining submerged during both low and high water. Oyster were collected from Kalinadi estuary occasionally and sold in Karavan. There was no regular exploitation.

On the other hand the distribution of oysters in the Chendia creek was scattered along the bottom throughout the intertidal and submerged areas. It may be mentioned here that unlike the Kalinadi estuary, the Chendia creek has no source of freshwater except during the south-west monsoon season and consequently the distribution of substrata consisting of shells, and rocks within the creek vary little. Moreover the movement of the water to and from the creek is mostly due to the tidal incursions from the sea.

Hence the difference in the pattern of distribution of both the substrata and oysters between the Chendia creek and Kalinadi estuary may be attributed to the more stable conditions prevailing in the former than the latter.

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REFERENCES

ALAGARSWAMI, K. AND K. A. NARASIMHAM. 1973. Clam, cockle and oyster resourcesof the Indian coasts. *Proc. Symp. Living Resources of tiie seas around India,* CMFRI, Cochin. 648-658.

NAIR, K. N , K. RAMDOSS *AHQ* C. T. RAJAN. 1954. Molluscan resources of Kali river estuarine system Karnataka. *Mar. Fisti. Infer. Ser. T. a E. Ser,* 58: 1-8.

PATIL, A. M. 1952. Study of the marine fauna of the Karwar coast and neighbouring islands. Part III: Mollusca (contd.)-Scaphopoda, Pefecypoda and Cephalopoda. *J. Bomb. nat. Hist. Soc,* 51 (1): 29-41.