

CMFRI

bulletin 42

Part One

AUGUST 1988



NATIONAL SEMINAR ON SHELLFISH RESOURCES AND FARMING

TUTICORIN

19-21 January, 1987

Session - I

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
(Indian Council of Agricultural Research)
P. B. No. 2704, E. R. G. Road, Cochin-682 031, India

ASSESSMENT OF CLAM RESOURCES IN THE ESTUARIES OF DAKSHINA KANNADA

G. Syda Rao and M. M. Meiyappan

Central Marine Fisheries Research Institute Cochin-682031.

ABSTRACT

Clam resources in all the eight estuaries of Dakshina Kannada, viz., the Nethravathi, Gurpur, Mulky, Udyavara, Swarna, Sita, Coondapoor and Uppunda were assessed during 1984. The total clam resources (standing stock) of these estuaries are estimated at 4900 t. About 92% of this resource was found in the Mulky estuary. The clam resources were negligible and formed less than 1% in the Udyavara, Swarna, Sita, Coondapoor and Uppunda. *Meratrix casta* is the chief species followed by *Paphia malabarica* and *Villorita cyprinoides*. Species-wise distribution of clams in different estuaries along with the environmental parameters and biological characteristics of different clam species are presented. Information on the utilisation and marketing is also given.

INTRODUCTION

Clams are the chief molluscan resources of the estuaries and back waters along the Karmake coast. They are gaining importance in the economy and in recent times an export trade for frozen clam meat is being developed. Earlier works on the clam resources of this area are by Alagaraswami and Narasimham (1973),

Rao and Rao (1985) and Narasimham et al (>1986). Gopal et al (1975) and Rao (1983) dealt on shell deposits while Rao (1984) made observations on the clam fishery,

MATERIAL AND METHODS

The clam survey of the Nethravathi, Gurpur, Mulky, Udyavara, Swarna, Sita, Coondapoor

and Uppunda estuaries was conducted during April-May 1984, Salinity, oxygen, temperature, pH and sediment data were collected and analysed from each bed. Depending upon the extent of clam bed, the number of samples varied. If the area is under 5 ha, 5 samples were collected, and 10 samples/5-20 ha, 20 samples/20-50 ha, 30 samples/50-100 ha and 50 samples if the area is more than 100 ha. One square metre of the bed was sampled with the help of a galvanised iron frame, the sediment was passed through a 2 mm mesh to retrieve the clams. A portion of the sample was examined for biological analysis, like length frequency, condition index, and stage of maturity. The average weight of clam species in each bed was taken into consideration to quantify the clam resources in each bed. The extent of the clam beds was calculated based on length and average width of the bed. All the estuaries and clam landing centres of Dakshina Kannada were visited once in a month during 1983 to collect data on the quantity landed, species composition, number of persons involved and method of collection. These observations were supplemented with the enquiries from the fishermen and merchants-

in all the three beds (Table 1). The total standing stock was estimated at 75 t. Most of the clams were small sized. The substratum was sandy and salinity ranged from nil to 17ppt. The dissolved oxygen ranged from 5 to 5.7 ml/l and pH varied between 7.5-8.0. In this estuary clams are exploited by hand picking. During 1983, 149 t of *V. cyprinoides* and 233 t of *A7. casta* were exploited. During the current survey *M. casta* were observed only in stray numbers. In 1979 (Rao and Rao 1985), *M. casta* Was observed in good concentrations.

Gurpur estuary: The total standing stock of clams during April 1984 was estimated at 3451 (Table 1) in 72 ha. *P. malabarica* was the dominant species, followed by *V. cyprinoides* and *M. casta*. The substratum is sandy; salinity ranged from 26.16 to 35.5 ppt, dissolved oxygen from 4.1 to 5.1 ml/l and pH 7.5 to 8.0. The exploitation of clams was by hand picking, clam nets and shell-dredge. Shell-dredge was mostly used to collect *P. malabarica* as it was found in slightly deeper waters, near the mouth of the estuary. In 1979 (Rao and Rao 1985), *P. malabarica* was not observed. The estimated clam landings during 1983 (Table 2) from this estuary were about 1281 t, out of which about 50% were *P. malabarica*.

Mulky estuary: This is a small but very important estuary for clam resources with maximum stand-

RESULTS

Nethravathi estuary: There were three beds covering 48 ha. *Villorita cyprinoides* was found

TABLE 1. Clam resources of Karnataka south zone (Dakshina Kannada). April-May 1984 (in tonnes).

Estuary	<i>M. casta</i>	<i>P. malabarica</i>	<i>V. cyprinoides</i>	Total
Nethravathi	@	—	75.426	75.426
Gurpur	84.2	164.82	94.800	343.82
Mulky	3663.00	744.00	@	4407.00
Udyat/ara	33.8	@	@	33.80
Swarna	@	—	@	@
Site	3.42	—	@	3.42
Coondapoor	18.8	@	—	18.8
Uppunda (Baindoor)	@	@	—	@
Total	3803.22	908.82	170.226	4822.266

@ indicates stray occurrence of the species.

TABLE 2. Species wise clam landings of the estuaries of Daicshiina Kannada during 1983 (in tonnes).

Estuary	<i>M. casta</i>	<i>M. meretrix</i>	<i>P. malabarica</i>	<i>v. cyprinoides</i>	<i>K. opima</i>	Total'
Nethravathi	233	—	—	149	—	382
Gurpur	307	—	600	374	—	1281
Mulcy	1814	—	578	—	—	2392
Udyavara	216	—	6	—	—	222
Swarna	—	—	—	15	—	15
Sita	362	8	—	2	5	377
Coondapoor	53	43	528	8	8	640
Uppunda	11	...	80	—	69	160
Total	2,996	51	1,792	548	82	5,469
/o	54.8	0.9	32.8	10.0	1.5	

ing stock when compared to other estuaries. The total standing stock during May 1934 was 4407 t, spread over an area of 232 ha, occupying almost one third of water spread of the estuary. *M. casta* was dominant followed by *P. malabarica*. Clams from this estuary are marketed in most parts of Dakshina Kannada. Here clams are collected by hand-picking and clam nets. The magnitude of clam landings from this estuary varied from 40 t to 951 t during 1978-82 (Rao 1934). However the landings have showed considerable improvement during 1932-84 and amounted to 1659 t and 31091 respectively. In general *M. casta* was the dominant species. The substratum is sandy; salinity ranged between 35.1 to 35.65 ppt, dissolved oxygen from 39 to 4.7 ml/l and pH from 6.5 to 7.5.

Udyavara estuary: A 10 ha clam bed was located, with a standing stock of 34 t of *M. casta* (Table 1). In 1980 good stocks of *M. casta* and *P. malabarica* were observed (Rao and Rao 1985), During 1983 the clam landings were estimated at 222 t (Table 2) compared to 250 t during 1980. The substratum is sandy. The salinity ranged from 29.83 to 35.16 ppt, oxygen from 4.1 to 5.1 ml/l and pH from 6.5 to 7.5.

Swarna estuary: This estuary joins the sea, after confluencing with the Sita estuary. No recognisable clam beds were observed in this estuary. *V. Cyprinoides* and *M. casta* were available in negligible numbers. The estimated clam landings during 1983 were about 15 t of *V. cyprinoides*. In 1979 also (Rao and Rao 1985) very poor clam resources were observed. The sediment is sandy, salinity varied from 28.2 to 35.65 ppt; dissolved oxygen from 4.1 to 4.6 ml/l and pH from 6.5 to 7.5. Sub-soil shell-deposits are exploited from this estuary on a large scale.

Sita estuary: In this estuary also, the clam resources were negligible. *M. casta* were found in very low densities in an area of 9 ha. In 1979, Rao and Rao (1985) reported on good clam resources. The estimated annual landings of clams during 1983 were 377 t. The sediment is sandy; salinity ranged from 28.2 to 35.6 ppm, dissolved oxygen from 4.1 to 4.6 ml/l and pH from 6.5 to 7.5.

Coondapoor estuary: This is one of the biggest estuaries in Karnataka. However, very limited clam resources were observed. In 1979, moderate clam resources were observed (Rao and

Rao 1985). During 1983 the estimated clam landings (table 2) from this estuary were 6401, mostly comprising *P. malabarica*. Other clam species observed are *M. meretrix*, *M. casta* *V. cyprinoides* and *K. opima*. There is heavy sub-soil shell deposit exploitation in this estuary (Rao 1983).

The substratum is sandy, salinity ranged from 30.4 to 35.15 ppt; dissolved oxygen from 4.2 to 4.6 ml/l and pH value of 7 was recorded.

Uppunda estuary: This is the smallest estuary in Dakshina Kannada. No recognisable clam bed was observed. Few specimens of *P. Malabarica*. *K. opima*, *M. casta* and *M. meretrix* were collected. A total of 160 t of clams were landed during 1983 (Table 2). During 1980, Rao and Rao (1985) also observed very poor clam resources. The sediment is sandy; salinity ranged from 33.49 to 35.65 ppt, dissolved oxygen 4.0 to 4.1 ml/l and a pH value of 7 was obtained.

Condition index: The condition index based on pooled samples from all the estuaries of Dakshina Kannada are 9.35 for *M. casta* 14.45 for *P. malabarica* and 10.09 for *V. cyprinoides*. It shows that *P. malabarica* has more flesh, when compared to the other two species, particularly after 30 mm length. There were some variations in the condition index from estuary to estuary.

Maturity stages: Most of the clam species observed in these estuaries were in indeterminate condition. However few *M. casta* in the Mulky estuary were in mature and spent condition. Similarly in the Nethravathi estuary about 29% of *V. cyprinoides* were in mature and spent condition.

Utilization and marketing: Flesh of *P. malabarica* and *V. cyprinoides* is used for gastronomic purpose. *M. casta*, when available in plenty, particularly between September-January period are exploited for their shells. The clams are marketed in fresh condition in different villages of Dakshina Kannada.

REMARKS

The total estimated standing stock of clams in the estuaries of Dakshina Kannada was about 4800 t. *M. casta* is dominant (79%) followed by *P. malabarica* (19%) and *V. cyprinoides* (2%). *K. opima* and *M. meretrix* were observed in stray numbers. Rao and Rao (1985) estimated the standing stock of clams from these estuaries at 53000 t during 1979-80. The present estimate of standing stock is slightly

lower when compared to the previous assessment. This is mainly due to the poor clam resources in most of the estuaries; other than Mulky and Gurpur estuaries. Appearance of considerable stocks of *P. malabarica* in the Gurpur estuary indicates that the proportion of different species in a given estuary can undergo fluctuations over a period of time. When compared to the earlier study (Rao and Rao 1985) the variation in the individual estuaries of Dakshina Kannada, as a whole, is small, although fluctuations in the individual estuaries are wide. In general, compared to earlier study there is a significant increase in the proportion of *P. malabarica*. The near absence of *M. meretrix* and other species of clams in the Coondapoor estuary, where extensive sub-soil shell deposit exploitation is practised, is noteworthy (Rao 1983).

ACKNOWLEDGEMENTS

We are grateful to Dr. K. Alagaraswami, former Head of Molluscan Fisheries Division for encouragement. Dr. K. A. Narasimham, Officer-in-Charge, Kakinada Research Centre of CMFRI, for critically going through the manuscript and Shri D. Nagaraja for his Technical assistance.

REFERENCES

- ALAGARSWAMI, K, AND K. A. NARASIMHAM. 1973. Clam, cockle and oyster resources of the Indian coasts. *Proc. Symp. Living resources of seas around India, 648-658*.
- GOPAL, B., M. MUNISWAMIAH AND B. M. KRISHNAREDDY. 1976. Lime shell deposits of Mangalore taluk, south Kanara District. Geological Studies No. 11 4., Govt, of Karnataka. Dept. of Mines and Geology, Bangalore.
- RAO, G. SYDA. 1983. Exploitation of clam shell deposits in the Kundapur estuary. *Mar. Fish. Infor. Serv. TSE Ser.. 49; 20-22*.
- RAO, G. SYDA. 1984. Clam Fishery of Mulky estuary during 1978-82. *Indian J. Fish., 31 (2) 228-232*.
- RAO, G. SYDA AND K. SATYANARAYANA RAO. 1985 Survey of clam and oyster resources of some Karnataka estuaries *Indian. J. Fish., 32 (1) : 74-89*.
- NARASIMHAM, K. A., G. SYDA RAO AND G. P. K. ACHARI. 1986. The clam resources. *R&D Series for Marine Fishery Resources Managements, CMFRI, Cochin*.