

# CMFRI bulletin 42

Part One

AUGUST 1988



## **NATIONAL SEMINAR ON SHELLFISH RESOURCES AND FARMING**

**TUTICORIN**

19-21 January, 1987

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**Session - I**

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**CENTRAL MARINE FISHERIES RESEARCH INSTITUTE**  
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# 30 FISHERY AND BIOLOGY OF THE WINDOWPANE OYSTER *PLACENTA PLACENTA* L- IN POSHITRA, GULF OF KUTCH

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## ABSTRACT

During April 1986 to March 1986 a preliminary survey was undertaken to study fishery and biology of windowpane oyster in the Gulf of Kutch, covering three centres viz. 1. Poshitra, 2. Goomara, 3. Raida. The population density was from 3 to 9/m<sup>2</sup> at Poshitra, 16/m<sup>2</sup> at Goomara and 2/m<sup>2</sup> at Raida. Aspects of the fishery and biology of the windowpane oyster are dealt and suggestions for the management of the resource are made.

## INTRODUCTION

In the Gulf of Kutch, extensive windowpane oyster beds exist in the Pindhara Bay, particularly on its Southern side. Horneil (1909) gave an account on the anatomy, distribution and utility of windowpane oyster. Mosses (1938) dealt on the pearl fishery while Varghese (1976) and Sarvaiya (1982) described the windowpane oyster fishery of Pindhara Bay in the Gulf of Kutch. This study updates the information on fishery and biology of the windowpane oyster of this region.

## MATERIALS AND METHODS

Temperature of the surface water was taken with a thermometer. Salinity was determined by Mohr method (Barnes 1959).

Observations were made on existing fishery. Survey of windowpane oysters was carried out by random quadrant method at three places viz. Poshitra, Goomara and Raida. A 1 m x 1 m wooden quadrant was used. Fifty or more or less quadrants according to the size of an area were measured and population from each quadrant was recorded, summed up, averaged and then population from different areas was calculated.

For biological study, windowpane oysters were collected by hand picking from the intertidal zones of Poshitra, Goomara and Raida. A total of 655 windowpane oysters of length range 7.5-16 cm were studied. They were measured antero-posterior direction for breadth and dorso-

ventral axis for length. Weight was taken by weighing it on balance. A total 110 windowpane oysters were analysed for gut contents study, the gut contents of the oysters were preserved in 5% formalin and examined under microscope. A total 655 numbers of windowpane oysters were dissected for gonadal study. Morphological study of gonads was carried out by seeing colour and physical texture. For detail study, gonads were observed under microscope. Pests and commensals of oysters were recorded.

## RESULTS AND DISCUSSION

### *Distribution*

Windowpane oysters were available from Bey-Balapurto Sachana. (Hornell 1909, Moses 1938). In the present study it was observed that the natural grounds of the windowpane oysters are restricted from Poshitra to Chudeshavar, covering a coast line of 90 km. The extent of the Windowpane oyster bed at Poshitra, Goomara and Raida was observed at 20, 60 and 5 ha respectively. These days windowpane oyster fishery is extensively carried out at Goomara due to the richness of grounds there and also due to the limited natural stock at Poshitra region.

Besides, it was reported by fishermen that good quantities of windowpane oysters are available at Jakhau area.

### *Description of beds*

The windowpane oysters inhabit muddy bottom of Pindhara Bay and near by areas. This area is shallow and horseshoe shaped. It is protected by contiguous elevated lands and plain salt pans, developed in Rann Bay. The bottom is an admixture of sand and clay particles. The oysters usually lie with their convex side resting on the substratum. The oysters occur from intertidal zone to a maximum 4m deep waters. The common fauna in the beds are the mud crab, *Scylla serrata*, gastropod, *Cerittiidea fluviatilis* and tube dwelling plychate, *Eunice tubifex*.

### *Hydrography*

Salinity of water over the windowpane oyster ground ranges from 30-37‰, and temperature 19°-33° C.

### *Observations on fishery*

General accounts of the windowpane oyster fishery of the Gulf of Kutch have been well documented by Varghese (1976) and Sarvaiya (1982). However, additional observations on fishery are discussed briefly hereunder. Windowpane oyster lease and leasee is fixed by Commissioner of Fisheries, Gandhinagar for a fixed period by accepting highest tender. Fishermen are drawn from Behan Bara, Nana Asota, Mota Asota, Ajad, Virpur, Pindhara, Gopi and Dwarka in addition to other centres, Koli Community is also involved in fishery. Camps are also established at Bhada, Kurchli, Pindhara, Goomara and Ajad. Materials like gunny bags, threads, bamboo poles etc. are supplied by the leasee for camp establishment. The fishery is throughout the year due to short period of lease and high tender. Fishery is started from 11th phase of moon. Kimarakot, Rozi, Raida, Chudeshvar, Ajad are fishing centres. Monthly 50 lakh oysters are exploited 7.5 cm (5%), 7.5-10 cm (20%), 10-12 cm (39%) and 12-16 cm (36%) are sizes of oysters harvested commercially. Thus, it was observed that 25% oysters exploited are undersize against the size (11.4 cm) prescribed by Fisheries Dept.

Payment at the rate of Rs 18-20/g of pearl dusts is made to fishermen in cash on

every fortnight after weighing pearl dusts at different camp sites on 6/7 phase of moon. Similarly to machhawa owners at the rate of Rs 300-375/ fortnight. No payment for shells is made to fishermen.

Since the last few years oyster tender, collection of pearl dusts and shells collected commercially are recorded increasingly.

### *Fishing craft*

Local machhawas are used for the transport of men from camp sites to fishing grounds and then back to bring their catches. These are non-mechanised sailing boats, Overall length of the boats ranges from 6- 8.5 m and breadth from 1.70-2.40 m. Besides, many fishermen use wooden contraptions of 0.70-0.80 m x 0.90-1.5m for propulsion in the mudflats.

### *Fishing gear*

Fishermen collect windowpane oysters by hand-picking in shallow water and by diving and hand picking in deeper waters.

The catch is emptied into a bag known as "Gumbha". It is approximately 0.60-1. m in length and 0.76-0.91 m in width with mesh size of 3"-4" and made of monofilament.

### *Survey of Placenta placenta beds*

At Poshitra different sites covering 20 ha were surveyed and the windowpane oyster population was estimated at 12,00,000 numbers. The density varied from 3-9 no/m<sup>2</sup> with an average of 6 m<sup>2</sup>.

At Goomara, survey of 60 ha was undertaken during December and the windowpane oyster population was estimated at 90,00,000 giving a density of 15/m<sup>2</sup>. During survey it was observed that the number of dead shells of young windowpane oysters was thrice the numbers of live oysters.

At Raida, 5 ha area was surveyed and the total population was estimated at 1,00,000 giving a density of 2/m<sup>2</sup>. The low density was due to heavy exploitation.

*Biology of windowpane oyster*

*Length - weight studies*

The length-total weight relationship was derived by using the formula  $W = (A) (Bx)^X$ , where W is the weight of the oyster in g, B is the length in cm, and A and X are constants. The logarithmic transformation of the formula gives a linear regression. The constants A and X were estimated by the usual method of least squares. The relationship is given by the following equation.

$$\log T. W. = - 2.0809 + 2.2516 \log L$$

Similarly the length-animal weight relationship is given by the following equation.

$$\log A. W. = - 1.9303 + 1.9762 \log L$$

*Length-breadth studies*

The length-breadth relationship is given by the following equation.

$$\log B = 0.4471 + 0.9249 \log L$$

Based on the growth data given by Pearson

(1912) the age structure of the windowpane oysters show that they are 5-27 months old and 7-11 month old oysters were dominant.

*Gut contents*

Phytoplankton namely *Nitzchia* Spp, *Navicula* Spp, *Pleurosigma* spp, *Chaetoceros* spp. and *Sceletonema* spp were observed.

*Conadial study*

It was noticed that the windowpane oyster is diocious. In each sex, the gonad appears as regular mass of yellowish tissue largely covering the organs of alimentary canal.

The gonad in the male appears smaller than in the female. Morphologically sexes are distinguished by colour when viewed against light. Male gonad is soiled yellow whereas female gonad appeared orange. Eggs are orange yellow and measure almost 45  $\mu$ m in diameter.

Mature males were observed from June to March (Table-1). Majority were nwture during September-December and then the number decreased from January-March.

TABLE 1. Showing gonad study

Sex and Maturity	Apr. 1985	May	Jun,	Jul.	Aug.	Sep.	Oct.	Nov.	Oec	Jan. 1985	Feb.	Mar.
<b>MALE</b>												
1. Imature	74%	76%	-									
2. Partially mature	26%	24%	20%		-	24%	-	-	-	-	-	-
3. Mature			44%		57%	53%	79%	67%	73%	41%	38%	22%
4. Spent		-	26%		43%	23%	21%	33%	27%	59%	62%	78%
<b>FEMALE</b>												
1. Imature	50%	30%										
2. Partially mature	50%	50%	33%	-								
3. Mature		20%	67%	-	<b>67%</b>	<b>60%</b>	<b>67%</b>	<b>67%</b>	<b>66%</b>	<b>38%</b>	<b>30%</b>	<b>20%</b>
4: Spent					33%	-	33%	33%	34%	62%	70%	80%

Females were mature during May-March. However, majority were mature during August-December and their number declined in the following 3 months. These observations are generally in agreement with the spawning period mentioned by Hornell (1909) and Mosses (1938).

First maturity observed at the 11th month age (Length 108 cm) of windowpane oyster. Age is derived by following Pearson (1912) length-breadth relationship with age.

#### *Pests and commensals*

The polychaetes, *Polydora* and *Eunice tubifex* and rock oyster, *Saccostrea cuculata* were found on the shell surface of windowpane oysters. The crab, *Pinnotheres placunae* is present in the body of windowpane oysters and is a commensal (Hornell and Sothwell 1909).

#### SUGGESTIONS FOR THE MANAGEMENT OF THE RESOURCE

1. Majority of males and females were mature during Sept-December. They should not be exploited during peak breeding season.
2. Undersize oysters below 11.4 cm were fished out in large quantities (25%). It should be stopped. Even if they are harvested, they should be relaid with the convex side downwards in the fishing ground.
3. Present study reveals that windowpane oysters occur in between Poshitra to Rozi point (near Chudeshyar). They should be transplanted to nearby areas in order to establish new beds.
4. Before leasing out windowpane oyster fishery, a spot survey should be undertaken

to estimate the abundance of oysters in the beds.

#### ACKNOWLEDGEMENTS

The authors are deeply indebted to the present Commissioner of Fisheries for permitting to present this paper and to former Commissioner Mr. A. K. Luke I. A. S., for facilities provided and for his keen interest. Thanks are also due to Shri Ajit Magodia, I. A. S., Joint Commissioner of Fisheries, Gandhinagar and to Prof. N. D. Chhaya, Dy. Commissioner of Fisheries, Okha for their valuable help and for encouragement. The Superintendent of Fisheries, Jamnagar is acknowledged for providing data on windowpane oyster fishery and Mr. H. A. Ravai for nice typing.

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