J. mar. biol. Ass. India, 1994, 36 (1 & 2) : 77 – 80

ON SOME ASPECTS OF BIOLOGY OF THE CLAM *MERETRIX CASTA* (CHEMNITZ) IN MUTTUKADU BACKWATER*

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ABSTRACT

In the Muttukadu Backwater *Meretrix casta* (Chemnitz) is a continuous breeder with two peak periods of spawning — March-April and in August-September. The length composition of commercially exploited clams ranged between 22 mm and 42 mm and the 28. 0 - 33.9 mm group was predominant. Large scale mortality of clams in the fish culture pond and backwater was observed in May 1985 and March 1987 respectively. An attempt was made to correlate spawning and mortality of clams in the backwater with salinity, temperature and dissolved oxygen.

INTRODUCTION

ASPECTS of Biology, distribution and fishery of *Meretrix casta* were given by various workers (Hornell, 1916; Abraham, 1953; Ranade, 1964; Alagarswami and Narasimham, 1974; Sreenivasan, 1983). The clam bed is distributed to about 80 hectares in the Muttukadu backwater. These clams are fished by the local people exclusively for shells. The results of the study of spawning, size composition and mortality are given in this account.

The authors are thankful to Dr. P. S. B. R. James, Director, C.M.F.R.I., Cochin and Shri S. Mahadevan, C.M.F.R.I., Tuticorin for their encouragement. They also thank Dr. S. Ramamurthy, Madras for the help rendered.

MATERIAL AND METHODS

Fortnightly clam samples were collected from the Muttukadu Backwater and after taking the length meat was removed. Gonadal smear was examined under the microscope to note the sex and maturity stage. The data were pooled monthwise. Mass mortality of clams was observed twice during the period of observation. In such cases morality was estimated by taking random samples using 25 cm^2 quadrangle. The environmental parameters such as salinity, temperature and dissolved oxygen of the water were recorded.

OBSERVATIONS

Biology of clams

Ripe clams occurred throughout the year indicating that *M. casta* is a continuous breeder.

Female gonadal phases : The clams in maturing stage were observed during May-August and October-January (Fig. 1 a). Ripe clams were dominant during July-August and January-February. A high percentage of spent clams were found in May, September-October '85 indicated that there are two periods of intensive spawning, the primary one during March-April and the secondary one during August-September. Soon after spawning some of the clams were found with residual eggs undergoing regression.

* Presented at the 'Symposium on Tropical Marine Living Resources' held by the Marine Biological Association of India at Cochin from January 12 to 16 1988.

Male gonadal phases : The seasonal changes in the male gonadal phases are comparable to those observed in the females.

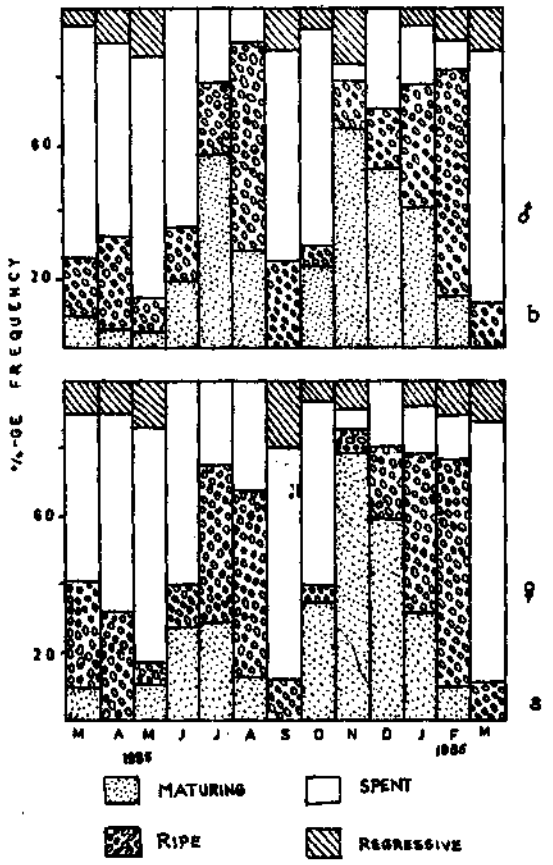

Fig. 1. Gonadal phases of *Meretrix casta*.

The developing or maturing clams were found to be high during June-August and October-January (Fig. 1 b). A high proportion of ripe clams were observed during April, August-September '85 and February '86. Clams in the spent condition were observed throughout the year with two peaks during March-July and September- October indicating the spawning of clams in the previous months. Some of the clams were found in the regressive condition soon after spawning as in the case of females.

Fishery

There is no organised fishery for clams at present, but Harijan women living in Muttukadu, Kovalam and Padu handpick the clams during April-September for making lime. Some women collect dead shells alone and sell at Rs. 8/20 kg. The shells are transported by trucks and lorries to the nearest kilns. Shell lime of the clam is sold at Rs.10/- per pora, weighing 3 kg. About 7.3 tonnes of clams are fished annually from the Muttukadu Backwater.

Size frequency

The length of the clams ranged between 22 and 41.9 mm. Of all the size groups 28.0 - 29.9 mm found to be dominant (23.4%) followed by clams in the size groups 30.0 - 31.9 mm and 32.0 - 33.9 mm (19.5%) in the population. Clams < 24 mm and > 38 occurred in small numbers.

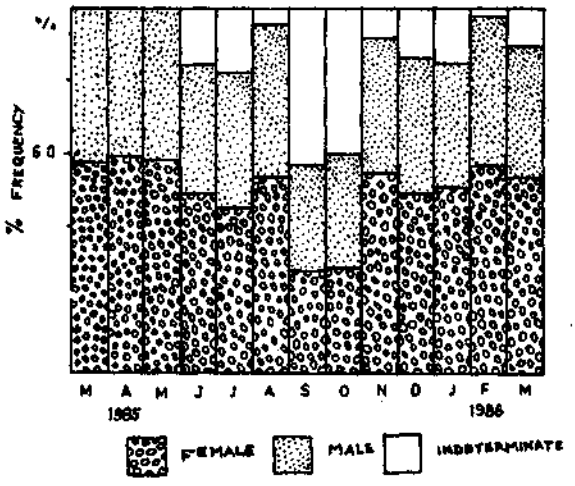

Fig. 2. Percentage of females, males and indeterminates in the population.

Sex ratio and indeterminates

Females outnumbered males throughout the year except in September and October when males were dominant (Fig. 2). The indeterminates occurred during June '85 - March '86 with a peak during September-October.

Mass mortality of clams

The fish pond B-3-2 was rich in clams containing 1330 nos/m^2. The average depth of the pond was 25 cm. On 25th May 1985 mortality of clams in the above pond was observed. Salinity and temperature during this period reached high values of 62 ppt and 39°C respectively. The clams were found dying in the salinity of 62 ppt. The mortality was estimated at 51.7%. The size frequency of dead clams ranged from 10.0 to 28.9 mm with a mode at 14.0 - 17.9 mm size group (Fig. 3 a).

Total mortality of clams in B-3-2 pond was observed on 13th June 1985 due to application of Mahua oil-cake to eradicate the predatory fishes in the pond.

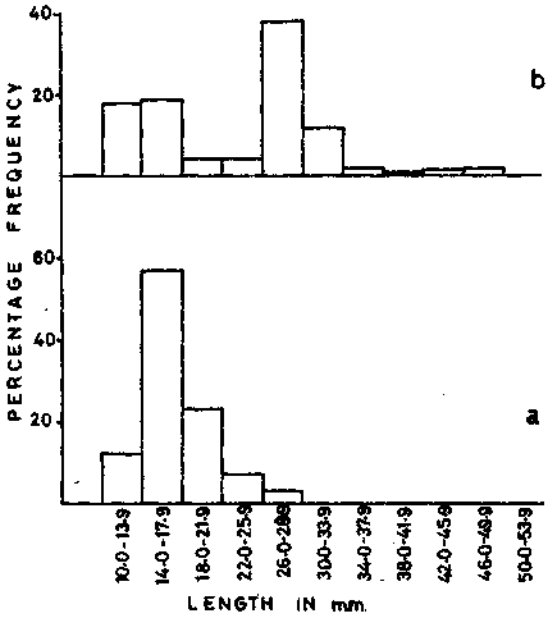

Fig. 3. Percentage frequency of dead clams in the natural bed of Muttukadu Backwater.

About 7.5 ha of Muttukadu Lagoon containing the clam bed was exposed on 21st March 1987 and all the clams were found to be dead in this area. The water temperature and salinity of backwater rose upto 40°C and 43.2 ppt respectively. The dead clams ranged in length between 10.0 - 47.9 mm (Fig. 3 b) and those in 26.0 - 27.9 mm group were dominant. Totally 78 t of the clams were estimated to be dead and 43 t of clam shells were collected from the backwater by clam fishers.

HYDROLOGICAL PARAMETERS

In Muttukadu Backwater the salinity ranged between 13.36 ppt and 37 ppt, water temperature between 28.0°C and 34.5°C and dissolved oxygen between 3.14 and 4.6 ml/l. There was a gradual increase in salinity and temperature during January-April which favoured the maturation of gametes. Salinity and temperature showed an ascending trend during March-May, which favoured the spawning of clams. There was a feeble decline in salinity, but not in temperature in August favoured ripening of clams and a further decline subsequently induced the clams to spawn. Spawning seems to be influenced by rise in salinity and temperature during March-April and lowering and salinity and temperature during August-October.

DISCUSSION

Among the molluscan shellfish, clams are regularly fished for meat and shell from most of the brackishwaters, creeks, coastal lagoons and estuaries in India. There is a good foreign market for frozen clam meat of some species such as *Paphia malabarica* and *Katelysia opima*. It is desirable to explore the possibility of export of the meat of *M. casta* and also to cultivate this species.

Hornell (1917) observed the spawning of *M. casta* twice in a year during April-May and in September. Abraham (1953) mentioned that *M. casta* of Adyar Estuary breeds in July-August with another peak in October-November and a third one during the summer months. Durve (1964) and Parulekar *et al.* (1973) have recorded that this species is a continuous breeder.

Sreenivasan (1983) has mentioned that the spawning of this clam from April-September in the Vellar Estuary. The present investigation revealed that *M. casta* breeds throughout the year as observed by Durve (1964) and Parulekar *et al.* (1973) with two spawning peaks during March-April and August-September.

The present study on mortality of clams due to rise in salinity in the summer season appears to be the first report. It is apparent that the salinity which touched 62 ppt does not appear to be conducive for the survival of clams.

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