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AGE AND GROWTH OF THE ESTUARINE CLAM *MERETRIX MERETRIX* (L) INHABITING THE VELLAR ESTUARY

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ABSTRACT

Age and growth of the estuarine clam *Meretrix meretrix* was studied from the Vellar estuary by employing different methods. The clam attained 24.5, 47 and 61.5 mm shell length during 0, 1st and 2nd years respectively. The life span of this clam appears to be two to three years.

Key-words: Clam, age, growth, *Meretrix meretrix*, Vellar estuary.

Studies on age and growth provides an insight into age class structure of the stock, changes in abundance of population, its relation to fishing, longevity and rate of growth. A few studies on the aspect of age and growth in clams are available (Rao, 1951; Abraham, 1953; Durve, 1970; Parulekar, Dwivedi and Dhargalkar, 1973; Harkantra, 1975; Sreenivasan, 1980; Kalyanasundaram, 1982). The present study was carried out on the estuarine clam *Meretrix meretrix* to assess the rates of growth and survival.

Random samples of *M. meretrix* were collected once in a month from the clam beds of the Vellar estuary (Lat. 11°30' N; Long. 76°46' E) for a period of two years (Oct. 1981 to Sept. 1983). Data on shell length were arranged in size groups of 5 mm and plotted against percentage size frequencies. Growth rate was determined by employing size frequency method, probability plot, Von Bertalanffy's equation and Ford Walford graph.

(a) *Length frequency distribution*

Length frequency histograms for the two years (Fig. 1) showed that fresh recruitment to the population appeared in the month of March 1982 and April 1983. These modes might be due to the spats settled after spawning in January and February. In 1981-82 earlier brood in January 1982 at 11-25 mm group was traced to 56-60 mm group in October 1981 registering 35 mm growth in 9 months time, which showed 46.7 mm growth in the first year. Then the 46-50 mm group in June 1982 was traced to 56-60 mm group in October '81 registering 10 mm growth in four months, in one year 30 mm growth which added to the first year growth comes to 76.67 mm (at the end of the second year). Further modes could not be traced.

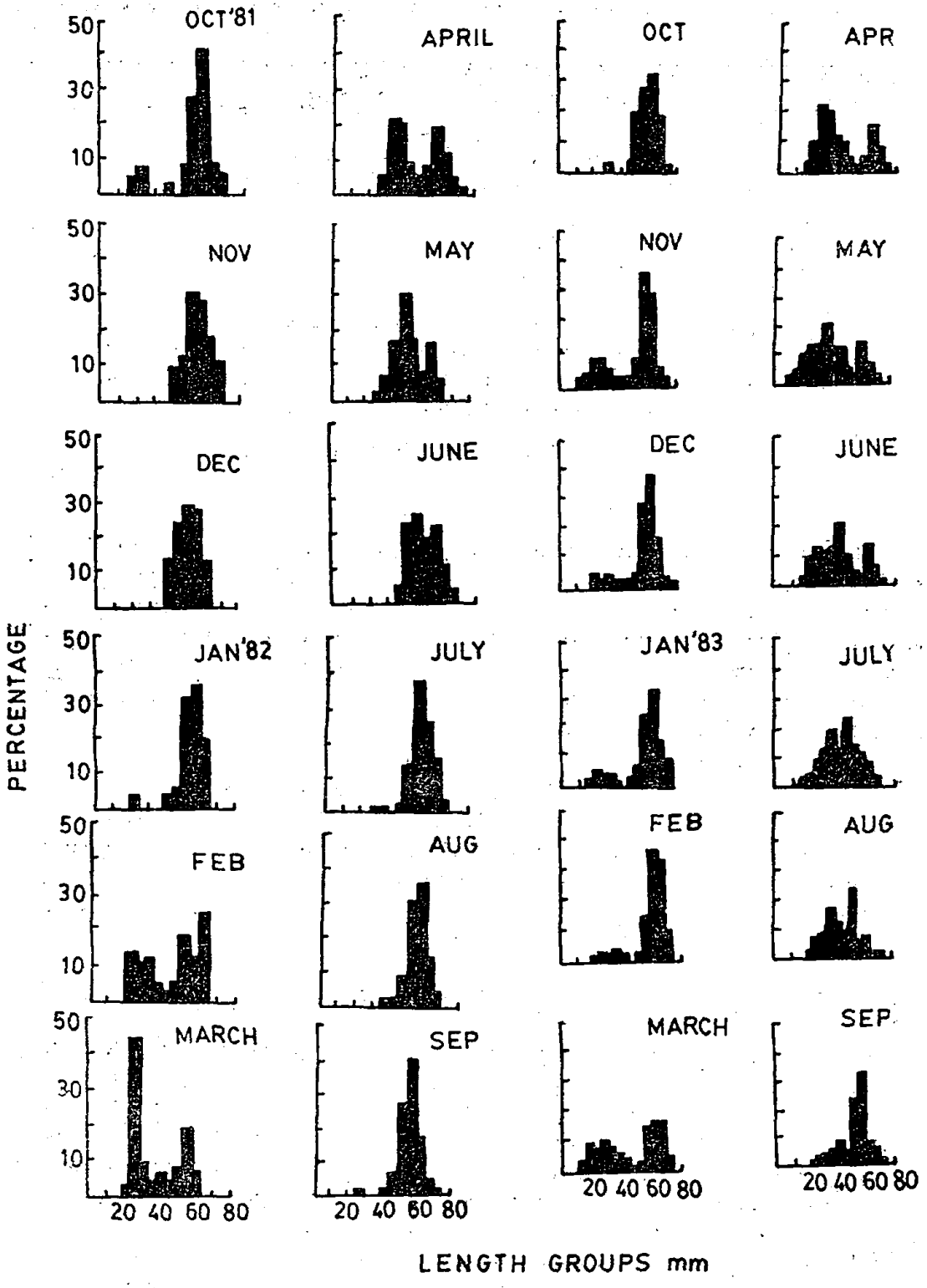

Fig. 1. Length frequency histogram for the years Oct. 1981 — Sep. 1983.

In 1982-83, earlier brood in March 1983 (group 16-20 mm) was traced to 41-45 mm group in Sept. 1983; registering 25 mm growth in 6 months i.e., 50 mm growth in one year. Again a mode in 51-55 mm group in October 1982 was traced to 61-65 mm group in June 1983, registering 10 mm growth in 8 months time, i.e., 15 mm growth in one year which when added to the first year growth shows 65 mm growth at the end of the second year. The life span of this clam appears to be two to three years normally.

(b) *Probability plot*

The cumulative percentage of occurrence of different size groups for two years were plotted separately in arithmatic probability paper in order to note the points of inflection (Fig. 2. A & B). Based on the data for the year 1981-'82 the probability plot showed a growth of 24.5 mm for 0 year, 47 mm for I year and 61.5 mm for II year. For the year 1982-'83 the probability plot showed a growth of 21.5, 47.5 and 64.5 mm for 0, I and II years respectively.

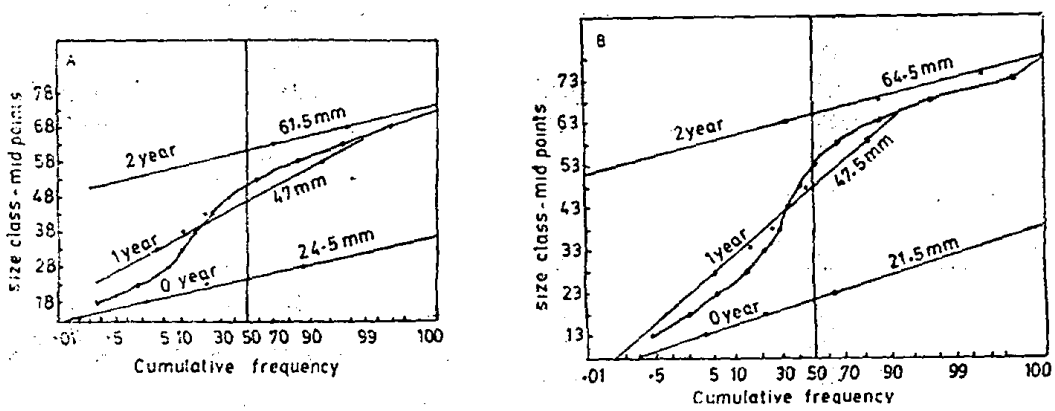

Fig. 2. Probability plot curve showing length attained in different year groups (A — 1981-'82 data; B — 1982-'83 data).

(c) *Von-Bertalanffy's equation*

From the sources of the probability plot, length calculated for different years using this equation was plotted along with the observed length of the same period which showed a general agreement in the growth pattern. Based on the data of the year 1981-'82, from the theoretical growth it can be observed that the clam attains 27.75, 48.34 and 61.34 mm for 0 year, 1st year and II years respectively. Theoretical growth curve for this clam, based on the data for the year 1982-'83 observed that the clam attains 21.53, 47.49 and 64.48 mm in length for 0, 1st and 2nd years respectively (Figs. 3.B & 4.B).

(d) *Ford-Walford graph* :

Ford-Walford graph was constructed for *M. meretrix* by plotting Lt. verses Lt+1, when interesected by a 45° diagonal from the origin. L ∞ (length at infinity)

was obtained as it was found to be 89 mm (1981-'82 data) and 98 mm (1982-'83 data) in length (Figs. 3A & 4A).

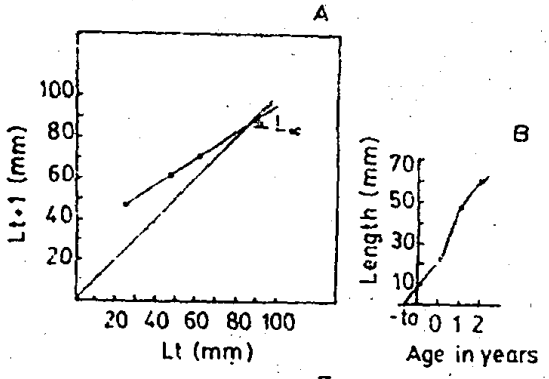

Fig. 3

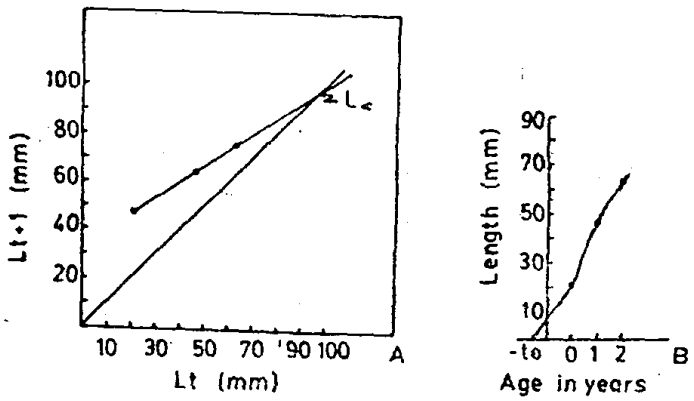

Fig. 4

Fig. 3. A. Ford-Walford graph showing maximum attainable length of the clam (1981-82 data).
B. Theoretical growth curve fitted using Von Bertalanffy's equation (1981-'82 data).
Fig. 4. A. Ford-Walford graph showing maximum attainable length of the clam (1982-83 data).
B. Theoretical growth curve fitted using Von Bertalanffy's equation (1982-'83 data).

The growth of *M. meretrix* estimated by employing different methods showed more or less similar results (Table I). Rate of growth in this clam decreased with

Table I: Growth estimation for *M. meretrix* employing different methods

Methods	Based on 1981-'82 data			Based on 1982-'83 data		
	Length (mm) at			Length (mm) at		
	0 year	I year	II year	0 year	I year	II year
Peterson method	—	46.67	76.67	—	50.00	65.00
Probability plot	24.50	47.00	61.50	21.50	47.50	64.50
Von Bertalanffy's equation	22.75	48.34	61.35	21.53	47.49	64.48

an increase in age. Generally the first year class recorded the highest growth rate (47 mm) and then the growth rate decreased in the second year (61.65 mm). Wilbur and Owen (1964) reported that the decrease in relative growth with an increase in age is well known in molluscs. Brown (1957) stated that specific growth rate declines as the age of the organism increases. Abraham (1953) and Harkantra (1975). also reported that the growth rate was greater in younger clams than in adult ones. Parulekar, Dwivedi and Dhargalkar (1973) observed a growth rate of 2.7 mm per month in *M. casta* in the Goa estuary. Growth rate of *Katelysia opima* from the Adayar estuary on the east coast was observed by Rao (1951) and it attains 22.5, 31.5 and 40.5 mm length during first, second and third year respectively, while as per Kalyanasundaram (1982) the same species attains a length of 26.65, 36.22 and 43.15 mm during first, second and third year respectively in the Vellar estuary. Present study on *M. meretrix* reveals that the clam attains 24.5, 47 and 61.5 mm length during 0, 1st and 2nd years respectively and showed slightly higher growth rate in the Vellar estuary when compared to other regions. The fast growth rate may be due to the availability of high amount of food and favourable salinity in the study area (Thangaraj, 1984).

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