

EXPERIMENTAL TRANSPLANTATION OF THE CLAM *MERETRIX CASTA* (CHEMNITZ) IN THE MARINE FISH FARM

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ABSTRACT

Several hundred clams, *Meretrix casta* (Chemnitz) obtained from Athankarai estuary (Long. 79°E, Lat. 9° 20'N.) on 28th October, 1964, were transplanted in the pond of the fish farm of the Central Marine Fisheries Research Institute, Mandapam Camp. During the period of study extending over six months, it was found that there was an initial high rate of growth in the seed clams immediately on transplantation. However, this rate of growth declined first slowly and then rapidly after five months. Probable causes for this uneven growth are discussed.

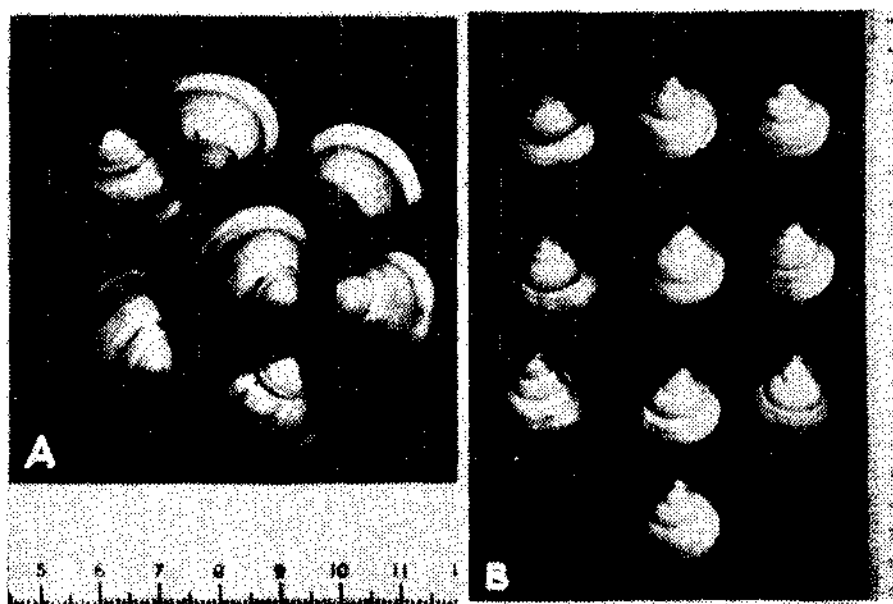
INTRODUCTION

Some work was carried out by the author on the biology and physiology of the clam, *Meretrix casta* inhabiting the different ponds of the fish farm of the Central Marine Fisheries Research Institute, Mandapam Camp (Durve, 1963, 1964, 1969 and Durve and Dharma Raja, 1965, 1968). During these investigations, it was found that the spat-fall from the indigenous stock of clams in the farm was negligible due to some unknown reasons. This naturally necessitated the transplantation of seed clams from other natural habitats to meet the sustained yield in the farm. An attempt was made in this direction in October, 1964 by transplanting seed clams from the natural beds of *Meretrix casta* in Athankarai estuary (Long. 79°E., Lat. 9°20' N.) about 15 km west of Mandapam, to the fish farm. The results of this investigation are reported here. Unfortunately, the study could not be carried out for prolonged period due to the causes discussed later.

OBSERVATIONS AND REMARKS

Several hundred clams were collected from Athankarai estuary on 28th October, 1964 with the help of a large sieve. All the clams collected belonged to the same year class and were of the size around 10-12 mm in height. They were dropped randomly all over the bottom of the pond No. 7 of the fish farm within about an hour after their collection. The size of the pond was 30.5 × 22.0 metres with an average depth of 0.5 metre. The detail topography, hydrology and other environmental conditions in the fish farm have been described by Tampi (1960).

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Clams showing the new growth, one and five months after the transplantation
(A) Growth after one month. (B) Growth after five months.

(Facing P. 56)

A sample of 100 clams was fished out from amongst the transplanted *Meretrix casta* on 1st November and measured with Vernier callipers for height, length and depth. The height denotes the maximum distance from umbo to the gaping margin; length, the maximum distance on the antero-posterior axis, and depth, the maximum distance between two valves taken externally. Such measurements of random samples of these transplanted seed clams were taken every month.

TABLE I. *The average size and its increase (growth) of the clam Meretrix casta in three different dimensions in each month*

Month	Height mm	Growth in Height mm	Length mm	Growth in Length mm	Depth mm	Growth in Depth mm
November 1964	12.25	...	15.77	...	6.76	...
December	17.92	5.67	21.12	5.35	10.96	4.20
January 1965
February	23.82	5.90	27.78	6.66	15.49	4.53
March	25.49	1.67	29.31	1.53	16.59	1.10
April	26.02	0.53	30.13	0.82	17.56	0.97

On December 1st *i. e.*, exactly one month after the first measurements, a sample of 105 clams were measured in which the average increase (growth) in height was found to be 5.67 mm (Table I.) In a small sub-sample of 60 clams, the actual width of the new growth was found to vary from 3.5 to 6.8 mm, the average being 5.05 mm. This new growth showed itself by a clear lemon-yellow band around the margins of clams (Plate I, A).

In January 1965, no measurements could be taken owing to the abnormal rise in the water level caused by the submersion of the entire fish farm in an unprecedented tidal wave that hit the coastal belt of Ramanathapuram district on 23rd December, 1964. The tidal wave damaged the fish farm, the field laboratories and even the approach road. However, the measurements of the seed clams could be continued up to April 1965.

The next sample of the transplanted clams was measured on 9th February 1965, *i. e.*, after a little over two months. This sample of 123 clams showed an average increase of 5.90 mm in height. In a sub-sample of 35 clams, the width of the new growth ranged from 9.00 to 16.50 mm with an average at 12.57 mm. This works out the growth of 3.76 mm per month for the period of two months of December and January (upto 9th Feb. 1965). Thus the fast growth of the first month (November) slackens to about its half in the next two months. The values of length and depth for these months also showed a similar retardation of growth.

The rate of growth retards still further by April 1965. A sample of 124 clams measured on 9th March showed the increase in height of 1.67 mm. This is less than half of the previous month. On April 9th, when 115 clams were

measured, it was found that the growth was negligible, being only 0.53 mm. The values of length and depth for these two months shown in the Table 1 appear consistent with the values of height (also see Plate I, B). The observations could not be continued further as a wide spread mortality was noticed amongst the transplanted clams in April 1965, and 115 clams collected for the purpose on 9th April as stated above, also began gaping in the laboratory.

From the foregoing account it could be seen that during the six months of the study, there was an initial high rate of growth in the seed clams immediately on transplantation. This rate of growth declined first slowly and then rapidly to the extent that the growth curve almost flattened at the sixth month or after five months of growth (Fig. 1). In this connection, it is interesting to mention here

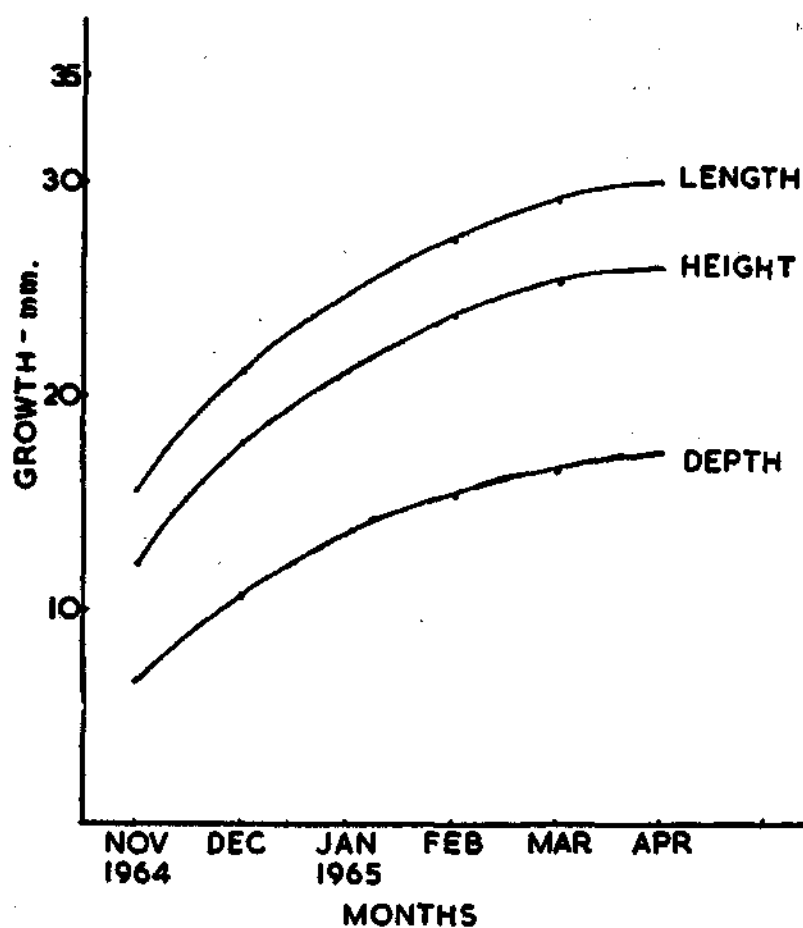


Fig. 1. Growth in each of the three dimensions of the clam *M. casta* during the period of study.

that the growth studies made earlier on the seed clams from pond 1 of the fish farm showed more or less uniform growth over a period of 22 months with a little retardation during the summer months. The uniform growth in height in this case ranged between 0.76 to 1.66 mm per month (Durve, 1970). The hydrological conditions in pond 1 during this study were, of course, more or less favourable.

Mason (1968) observed a greatly enhanced rate of growth in the cockle *Cardium edule* on its transplantation to a new area. In the present investigation, it is doubtful whether the initial higher rate of growth in the transplanted clams could be regarded as the enhanced rate of growth since there are no data available on the rate of growth of the clams of the same year class from Athankarai estuary for the sake of comparison. However, the casual observations made on the clams in December and February in Athankarai estuary at the spot of original collection did not show a well-marked lemon-yellow growth as found in the transplanted clams. Their general size also appeared less than that of the transplanted clams.

The probable causes for the initial higher rate of growth and its ultimate rapid decline in the case of the transplanted clams could be as follows. The salinity in Athankarai estuary at the time (28th October 1964) and place of collection of seeds was 29.43‰ and the pH was 8.6. The drop in salinity was due to the initial showers of the north-east monsoon and the consequent freshwater influx from the upper reaches of the river. The transplantation of seed clams from this locality to the pond 7 of the fish farm with a salinity of 34.82‰ might have stimulated the growth initially but later, the probable unfavourable conditions of the fish farm (Durve and Dharma Raja, 1969) have had effect on the growth, retarding it in the subsequent months. However the rapid retardation of growth during March and April as stated above is more likely to be due to the total stagnant conditions and the abnormal rise in salinity in the pond 7 resulted by the severance of connection of the supply canal with Palk Bay because of the shifting of sand during tidal wave. The salinity in April *i. e.*, at the time of fishing of clams for the study, was 68.03‰. As stated above, at this salinity level, there was a wide spread mortality in the transplanted clams and those that could survive were also on the way to death. It is however felt that, in normal circumstances the clams would have shown good uniform growth in the fish farm (pond 7) at least for some more period as in the case of the seed clams from pond 1 mentioned and reported earlier (Durve, 1970).

The results of this investigation indicate the feasibility of transplanting the seeds of the clam *Meretrix casta* from natural clam beds to the marine fish farm, provided a fresh supply of sea water to the pond is ensured. The later fattening of the clams will, of course, depend on several factors.

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REFERENCES

- DURVE, V. S. 1963. A study on the rate of filtration of the clam *Meretrix casta* (Chemnitz). *J. mar. biol. Ass. India.*, 5 (2) : 221-231.
- DURVE, V. S. 1964. Preliminary observations on the seasonal gonadal changes and spawning in the clam *Meretrix casta* (Chemnitz) from the marine fish farm. *J. mar. biol. Ass. India.*, 6 (2) : 241-248.
- DURVE, V. S. 1970. On the Growth of the clam *Meretrix casta* (Chemnitz) from the marine fish farm. *J. mar. biol. Ass. India.*, 12: 125-135.
- DURVE, V. S. AND S. K. DHARMA RAJA. 1965. A study on the dimensional relationship in the clam *Meretrix casta* (Chemnitz) collected from two localities. *J. mar. biol. Ass. India.*, 7 (1) : 69-79.
- DURVE, V. S. AND S. K. DHARMA RAJA. 1969. On the fatness of the clam *Meretrix casta* (Chemnitz). *Indian J. fish.* 16 : 170-173.
- MASON, J. 1968. Experimental transplanting of cockles, *Cardium edule* L. *Proc. Symposium on Mollusca*, Marine Biological Association of India, Pt. III : 824-831.
- TAMPI, P. R. S. 1960. Utilization of saline mud flats for fish culture—an experiment in marine fish farming. *Indian J. fish.*, 7 : 137-146.