A NOTE ON THE MEAT/SHELL RATIO AND SHELL VOLUME IN THE CLAM *MERETRIX CASTA* (CHEMNITZ)

ABSTRACT

The clam *Meretrix casta* (Chemnitz) from Athankarai estuary and three fish ponds differing in dissolved calcium content was studied. It was found that those living in the estuary having lower dissolved calcium concentration had lower meat/shell ratio, lower shell volume and thin shell than those living in the farm with high calcium content.

WHILE studying the condition factor in the case of the clam *Meretrix casta* from Athankarai estuary and ponds 1, 4 and 7 of the marine fish farm at Mandapam Camp (Durve and Dharma Raja, 1969; Durve and George, 1973), it was found that the shells of the clams from ponds of the fish farm were thicker than those of the clams of Athankarai estuary. To study this further, the ratio of meat volume to shell volume in 50 clams from each locality was determined. It was found that this ratio was constantly high in the case of clams from Athankarai estuary followed by the clams from ponds 1, 7 and 4 respectively. The higher meat/shell ratio may be due to the higher meat volume or lower shell volume (Baird and Drinnan, 1957). In the case of clams from Athankarai estuary, the higher meat/shell ratio stated above appeared to be due to both.

To ascertain this, the average meat volumes were plotted against average shell volumes from the different size-groups of clams (Fig. 1). It was found that the volume of meat was always higher for a given volume of shell in the case of clams from Athankarai estuary than in the case of ponds 1, 4 and 7 of the fish farm. This indicates that the meat volume is higher in the case of clams from Athankarai estuary. Further, the heights (maximum distance from umbo to the gaping end) in about 100 clams from each locality were measured with a vernier calipers and their shell-volumes determined. The clams were grouped in the size-groups of 3 mm along with their corresponding shell volumes. The average heights and shell volumes were determined for each size-group and plotted in the Fig. 2. It is evident from the graph in Fig. 2 that the shell volume is consistently low for any given height in the case of clams from Athankarai estuary, while it is higher in pond 4 and the highest in ponds 1 and 7. This indicates that the shells of clams from Athankarai estuary are thinner than those of clams from the fish farms and the higher meat/shell ratio in Athankarai clams is also due to low shell volume.

From the Fig. 2 it would also be seen that in the case of clams from pond 7, the bigger shells with the average heights of 43.01 and 45.70 mm have comparatively greater shell volumes of 12.30 and 14.45 ml respectively. It may be that, after attaining a certain height, the deposition of shell material is faster than the linear growth. This ultimately results in shells becoming thicker in the case of larger individuals. However, this possibility has to be confirmed by more elaborate experiments. In the present study, it was not possible to see this phenomenon in other localities as shells bigger than 38.0 mm could not be obtained for study from these localities.

It is well known that the source of calcium for shell formation in the case of molluscs is the dissolved calcium in water and the amount of calcium deposited in shell is the function of the calcium concentration in the medium (Rao and Goldberg, 1954; Koczy and Titze, 1958; Kado, 1960 and Wilbur and Young, 1964). The

values of dissolved calcium in ponds 1, 4 and 7 were 52.60, 51.00 and 45.00 mg %. In Athankarai estuary, the dissolved calcium was 40.00 mg %. The higher calcium values in the water of fish ponds could be expected because of more or less stagnant condition and the embankment of coral stones. It is likely that the calcium metabolism

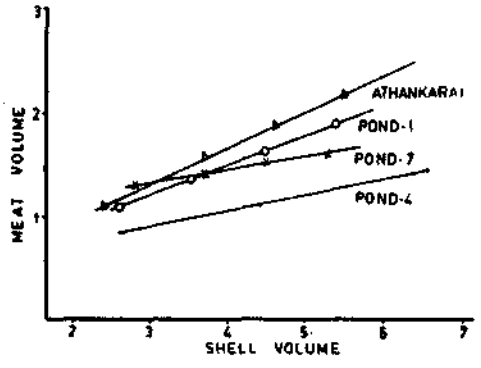

Fig. 1

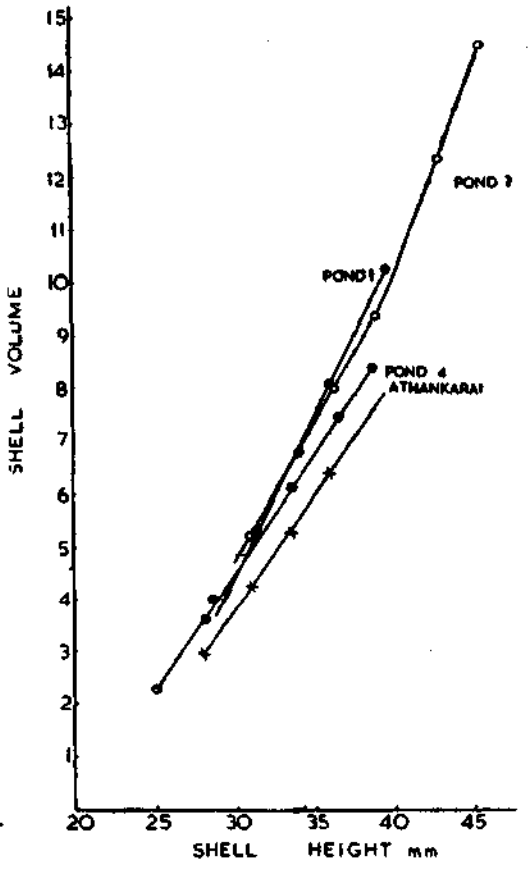

Fig. 2

in clams from fish ponds and the higher content of dissolved calcium in the water may be responsible for the thicker shells of clams occurring here. On the other hand, more or less stagnant conditions in the fish ponds may also affect the proper growth of clams resulting in the formation of thick shells. However, this needs further study.

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REFERENCES

BAIRD, R. H. AND R. E. DRINNAN 1957. *J. du. Cons.*, **22** (3): 329–336.

DURVE, V. S. AND S. K. DHARMA RAJA 1969. *Indian J. Fish.*, **16** : 170–173.

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———— AND K. V. GEORGE 1973. *Ibid.*, **20** (2) : 326–332.

KADO, Y. 1960. *J. Sci. Hiroshima Univ.*, Ser. BI **19** (4) : 163–210.

KOCZY, F. E. AND H. TITZE 1958. *J. Marine Res.*, **17** : 302–311.

RAO, K. P. AND E. D. GOLDBERG 1954. *J. Cellular Comp. Physiol.*, **43** : 283–292.

WILBUR, K. M. AND C. M. YOUNG 1964. *Physiology of Mollusca.* Academic press, Pp. 243–282.