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

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


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NOTES


