Mahasagar-Bulletin of the National Institute of Oceanography, 19 (1), 1986, 57-60

# ALLOMETRIC RELATIONSHIPS IN THE WEDGE CLAM *DONAX INCARNATUS* GMELIN

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ABSTRACT

In the wedge clam, *Donax incarnatus*, the allometric relationship between height, depth, shell weight, dry flesh weight and length was found to be the same for the entire size range of animals unlike in many other bivalves. The reasons for the above phenomena have been discussed.

**Key-words** : Wedge clam, allometry, *Donax incarnatus*

The wedge clam, *Donax incarnatus* is an important edible bivalve with a good fishery potential. From the Cochin region, the species is exploited in large quantities for flesh. Though the allometric relationships of several bivalves along the Indian coast have been investigated (Nayar, 1955; Durve and Dharma Raja, 1965; Alagarswami, 1966, Parulekar, Dwivedi and Dhargalkar, 1973; Cheriyan and Cherian, 1974; Talikhedkar, Mane and Nagabhushanam, 1976; Ansari, Ayyappan Nair, Harkantra and Parulekar, 1978; Shafee, 1978; Mohan, 1980; Mohan and Damodaran, 1981; Mohan, Damodaran and Salih, 1984), Similar studies have not been undertaken on this economically important clam. Hence, the present investigation on the allometry of *D. incarnatus* has been taken up with a view to the application of such information on the commercial exploitation of the species.

Wedge clams of different sizes were collected from the intertidal region of the Narakkal coast (10° 2' 20" N; 76° 12' 58" E), Cochin. The length (*L*; maximum distance along the long axis of the valves), height (*H*; maximum distance along the short axis of the valves) and depth (*D*; maximum thickness between the 2 valves when they were closed) were measured using a Vernier calipers Clams were kept in aerated sea water for 24 hr to defecate and the soft body parts were dried to constant weight (*W*) at 60°C. The dry shells were also weighed (*S*).

The allometric relationship between the various body parameters

$$\log Y = \log a + b \log X$$

where log *a* and *b* are constants was found to be the same for the entire size range of the wedge clams. The relationship between *H*, *D*, *S*, *W*, and *L* is shown in Fig. 1.

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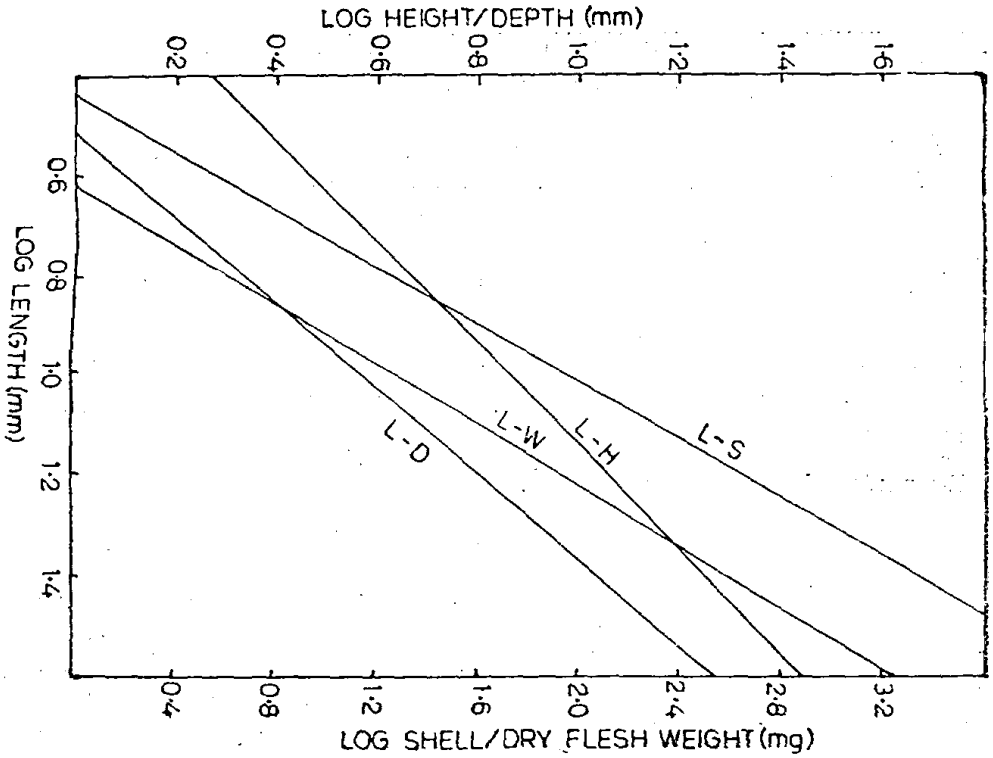


Fig. 1. Relationship between height (H), depth (D), shell weight (S), dry flesh weight (w) and length (L) of *Donax incarnatus*

*H* varied from 3.6 to 17.4 mm, *D* from 1.8 to 10.3 mm *S* from 0.0094 to 1.789 g and *W* from 0.0019 to 0.412 g for wedge clams whose *L* varied from 5.02 to 24.6 mm.

In *D. incarnatus* the allotmetric relationship is the same for the entire size range of animal (Table I) unlike in *Martesia striata* (Cheriyan and Cherian, 1974), *Perna viridis* (Shafee, 1978; Mohan; 1980); *Sunetta scripta*

Table 1. Allometric relationship between Length (*L*), Height (*H*), Depth (*D*), Shell weight (*S*) and Dry Flesh weight (*W*) in *D. incarnatus*. log *a* (*Y* intercept), b (slope) *r* (correlation coefficient) and *N* (number)

| Parameters | log a | b | r | N |
|---|---|---|---|---|
| L & H | –0.1099 | 0.9714 | 0.9821 | 96 |
| L & D | –0.5991 | 1.1714 | 0.9717 | 96 |
| L & S | –1.4600 | 3.4286 | 0.9128 | 96 |
| L & W | –1.9999 | 3.2857 | 0.8994 | 96 |

(Mohan and Damodaran, 1981) *Meretrix casta* (Mohan, Damodaran and Salih, 1984, and *Modiolus demissus* (Kuenzler, 1961). Similar observations have been reported in other wedge clams, *D. cuneatus* (Nayar, 1955; Thalikhedkar, Mane

and Naghabushanam, 1976) and *D. faba* (Alagarswami, 1966). Though Mc Lusky, Nair, Stirling and Bhargava (1975) have determined the length, width and weight of *D. incarnatus* to study the ecology of the wedge clam populations at the Goa coast the allometric relationships have not been found out and established.

The lack of variation in the allometric relationship of *D. incarnatus is due* to the nature of shell growth pattern. The growth generating line (Mohan, 1980) in *D. incarnatus, D. cuneatus* and *D. faba* is more linear and exhibits almost linear growth in *H* & *D* in contrast to many other bivalves, *M. striata, P. viridis, S. scripta* and *M. casta* where the growth generating line describes a logarithmic spiral resulting a change in the relationship at a particular growth stage of the animal. This explains why in the wedge clams, *D. incarnatus, D. faba* and *D. cuneatus*, the slope of the fitted regression line is the same for the entire size range of animal.

## ACKNOWLEDGEMENTS

The authors are thankful to Dr. G. S. Sharma, Professor and Head of the Department for his encouragement. Their thanks are also due to Mr. T. M. Sankaran, Lecturer in Statistics and Mr. M. K. Ganapathy, Lecturer in Mathematics for their help in the preparation of the paper, and to the University of Cochin, for the facilities provided. The financial assistance by the Department of Science and Technology (Government of Kerala) is gratefully acknowledged.

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