NOTES AND NEWS

ESTIMATION OF BODY MASS OF SHELL-DWELLING COENOBITIDS USING ADOPTIVE SHELL MORPHOMETRY (DECAPoda, PAGURIDEA)

BY

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A number of the physiological processes studied in decapodan crustaceans in our laboratory are scaled to body size (Schmidt-Nielsen, 1975) including metabolic rate, respiratory gas exchange and circulation (Adolph, 1949; Drorbaugh, 1960; Stahl, 1967). One problem we encountered recently in studying the land hermit crab *Coenobita clypeatus* (Herbst) was the determination of body mass (Wheatly, Burggren & McMahon, 1983). Forced evacuation from the shell is known to be detrimental, since it disturbs the equilibrium between the inhabitant and adoptive shell which must have some physiological significance for the behaviour to have been originally acquired (Reese, 1969).

The present note details a morphometric analysis of empty gastropod shells in an attempt to find a reliable method of estimating shell mass from external dimensions. By difference with gross mass, the mass of the inhabitant animal can be ascertained including in this estimate the volume of shell water which is contiguous with the gills and thereby analogous with branchial water.

The present analysis relates specifically to the habitation of West Indian top shells, *Livona pica* (Gray, 1847) identified by Morris (1951), which belong to the Gibbulinae subfamily of the trochacean gastropod molluscs. Following the

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Fig. 1. Dimension against mass for empty *Livona pica* shells. Vertical bar adjacent to Y axis indicates the range for shells inhabited in current physiological investigations in our laboratory and the line has been fitted by regression through this truncated range (for equations consult table).