EXPERIMENTAL TAPHONOMY: THE EFFECT OF SHELL SIZE AND SHAPE ON TRANSPORT WITHIN THE INTERTIDAL ZONE

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We conducted actualistic studies to determine how shell size and shape affect transportability in the intertidal zone. We measured the extent of transportation of an irregular echinoid, an inarticulate brachiopod, and six species of molluscs from the southernmost portion of the Colorado River Delta, Baja California, Mexico.

Shells varied in size and shape, ranging from the large, convex bivalve, *Chione fluctifraga*, to the small, planar brachiopod *Glottidia palmeri*. Intermediate sizes and shapes allowed us to discriminate the effects of size and shape on the likelihood of shell movement and burial.

Specimens were placed around a fixed point in two separate plots: one in the high intertidal zone (approximately 100m from the spring high tide line), and one in the low intertidal zone (approximately 500m from the spring high tide line). The distance and direction of travel and the extent of burial was recorded for each shell after one tidal cycle. The movement of 500 shells was recorded for 10 tidal cycles.

Shells tended to be transported landward and shells in the high intertidal zone tended to move farther. The heaviest shell, the bivalve *Chione*, was transported the least, travelling an average of only .05m. At the other extreme, the brachiopod *Glottidia* was transported the farthest: an average of 6.24m. The remaining species were of comparable mass, and their degree of transportation was a function of shell shape. Highly convex shells (the gastropod *Crucibulum*, and the bivalves *Ostrea* and *Mulinia*) were transported farther on average than planar shells (the echinoid *Mellita* and the bivalves *Argopecten* and *Tagelus*).

Shells in the low intertidal zone tended to be buried more frequently than those in the high intertidal zone. Shells with a more convex shape usually remained exposed and those with a more planar shape were often buried.

These experiments show how shell shape and size affect the transportability and burial of shells. Susceptibility to transport is a complex function of the interaction between shell size and shape. Size is the most important variable; small shells are transported farther than large shells. Within a given size, shape is important; convex shells move farther than planar shells. These criteria may be useful in assessing the likely degree of transport bias in fossil assemblages.