COMPARATIVE MOLLUSCAN TAPHONOMY: EXPERIMENTAL STUDY FROM A MODERN TROPICAL EPEIRIC SEA

LESCINSKY, Halard L., Department of Geology, University of California, Davis, CA 95616, USA.; EDINGER*, Evan, Department of Geology, McMaster University, Hamilton, Ontario, L8S 4M1, CANADA.

Here we report the preliminary results of an experimental taphonomic study of six species of molluscs in the Java sea: the bivalves *Anadara inflata, Anadara granosa, Sacostrea echinata, Placuna placenta, Paphia (paphia) undulata*, and the gastropod *Babylonia canaliculata.* The principle goal of this study is to determine rates of shell degradation and encrustation in a tropical epeiric sea. Comparisons will be made between high and low productivity environments, shells resting in the mud and those elevated on racks above the substrate, and interspecies differences.

Using SCUBA, shells were deployed on the seafloor in mesh bags similar to those used in the recent SSETI taphonomy experiments in the Gulf of Mexico. For each species, three lots of ten valves were deployed for each retrieval interval of 3 mo., 6 mo., 1 yr., and 2 yr. Bags with two-three individuals of seven additional species were also deployed for qualitative analysis. Specimens of two species (*Placuna* and *A. inflata*) were also attached to racks elevated approximately 30 cm above the sea floor.

Shells were deployed in two environments for which chlorophyll, suspended particulate matter, sedimentation, light levels and temperature data were collected. One set was located in 12 m of water on primarily clastic mud adjacent to the north central coast of Java, near Jepara. This sample is in turbid, highly productive water below fair weather wave base. A second set was deployed in similar depth water on carbonate sand adjacent to an offshore patch reef in the Karimunjawa Islands, central Java Sea. Water here was less turbid and had lower planktic productivity.

After 3 months, shells on the muddy seafloor (Jepara) were partially covered in sediment, but not buried. Some shell surfaces were stained, and some nacreous surfaces had lost their gloss; but most surfaces were remarkably well preserved. Little or no breakage occurred except for incidental chipping of the fragile margin of *Placuna*, which may have occurred during deployment or retrieval. Periostraca and hinge ligaments were well preserved. No macroscopic borings were observed and SEM studies revealed few microborings. A small net loss in shell weight occurred for all species. Bivalves lost between two and six percent of total weight, while *Babylonia* lost an average of 11% of shell weight probably reflecting the loss of dried tissue that was inextricable prior to the original weighing. Encrusting organisms (epibionts) were rare, but included sponges, barnacles, serpulid annelids and a few bryozoans.

Elevated shells were free of silt, experienced some marginal chipping (up to 40% of surface area of *Placuna* at Jepara) and had greater encrustation. Bivalves, barnacles, and bryozoans were abundant in more productive habitats; bryozoans, serpulid worms and coral spat in less productive ones. Cement settling plates placed adjacent to the shells were also much less encrusted near the Karimunjawa reef than at highly productive sites.

Preliminary results suggest that even in highly productive tropical waters, shells may suffer little degradation and encrustation during their first three months on the sea floor, especially if partially buried by mud or silt. Elevated shells are more heavily encrusted and chipped, but still remain surprisingly intact. The most striking differences in taphonomic history among shells are attributable to productivity differences between sites. Shells from highly productive areas are much more heavily encrusted than those from sites with low productivity. Future data from shells retrieved after up to two years will further our understanding of shell taphonomy in epeiric seas.