

EPIBIOSIS, SYMBIOSIS AND GASTROPOD TAPHONOMY IN THE DEEP SEA

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A synthesis of current research suggests several trends in deep sea taphonomy. First, epibiosis (the condition of having bionts on exoskeletons that is not obligate) appears to decrease with increasing depth. Epibionts, such as serpulid polychaetes and barnacles that take advantage of ephemeral hard substrates offered by crab exoskeletons, sea urchin spines or gastropod shells, appear to be more diverse and common at depths of less than 500 m. At abyssal depths, microbial communities on living shells are common and may contribute to the breakdown of molluscan periostracum. These communities may also have patchy distributions.

Second, shell-inhabiting symbionts, such as sea anemones uniquely associated with shells of pagurid crustaceans, are most common from 300 to 700 m. These unusual sea anemones cover hermit crab-inhabited gastropod shells with a chitinous material (Dunn et al. 1980) that may affect shell longevity. While gastropod shells without a periostracum may degrade quickly in calcium-poor waters, the chitinous covering secreted by the anemone may increase the post-mortem longevity of the shell.

Third, deep sea gastropods usually have eroded apical whorls but buttress this weakness with internal calcium plugs (J. McLean, pers. comm., 1992). In addition, not all deep sea gastropods, like buccinids, have thick periostracal layers. How differing periostracal thicknesses affect taphonomy is undetermined.

Finally, deep sea gastropod fossils occur throughout the Cenozoic from many geographic localities: Eocene (Oregon, United States), Upper Oligocene (France), Miocene (New Zealand, Japan), Miocene/Pliocene (Australia), and Pleistocene (Italy). Sedimentary deposits containing these gastropods vary from thin interbedded sediments within oceanic basalt (e.g., Eocene, Oregon), volcanic breccia with bathyal sediments (e.g. Miocene, Japan), turbiditic sequences (Neogene, Japan) and bathyal clays (Pleistocene, Italy). Fossil quality varies from poorly preserved internal molds with altered shell material, to excellently preserved specimens with calcareous layers intact. We will discuss how this record bears on the geographic and preservational differences among the various deep sea gastropod fauna.

Dunn, D. F., D. M. Devaney & B. Roth 1980. Stylobates: A shell-forming sea anemone (Coelenterata, Anthozoa, Actiniidae). Pac. Sci. 34: 379-388.