

Shell taphonomy and fidelity of living, dead, Holocene, and Pleistocene land snail assemblages

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ABSTRACT

Variations in the taxonomic composition of ancient land snail assemblages can potentially reflect changes in past ecosystems. The use of fossil associations as a paleoenvironmental-paleoecological proxy assumes that the original biological signature is retained, but postmortem processes can distort it. In this study, the fidelity of land snail assemblages was tested by comparing taphonomic and ecological variables recorded by live and dead, middle Holocene and Upper Pleistocene land snail shelly assemblages from San Salvador Island (Bahamas). Shells of living organisms were practically unaltered whereas dead and fossil shells were primarily affected by fragmentation, ornament loss, color loss, and carbonate coating. Taphonomic features fluctuated across space and time likely due to variable environmental conditions and/or time of exposure prior to shell burial. Live assemblages showed good taxonomic agreement with dead assemblages, although the later exhibited a higher number of taxa and individuals than the former. Assemblages that were moderately (dead and Holocene) and strongly (Pleistocene) taphonomically altered did not differ in species abundances, suggesting that the original biological signal was preserved. In contrast, unaltered (live and some dead) assemblages differed taxonomically from moderately and strongly damaged assemblages, likely as a consequence of different scales of time-averaging rather than variable shell-specific destruction rates. Taxonomic richness and simple dominance of time-averaged land snail assemblages were similar at various interglacial time periods (~125 ka, ~5–6 ka, and today). Such apparently equivalent snail richness may suggest that the climatic-environmental and/or ecological conditions at those times were comparable to the present.