

FOSSIL ABUNDANCE AND COMMUNITY STASIS

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A number of authors have noted that the neglect of abundance has significantly contributed to confusion about the community stasis issue. While taphonomic studies clearly show that the fine-details of population dynamics cannot be directly "read" from the fossil record, there is considerable evidence that fossil abundance is not random "noise". While this evidence is mainly inferential and tentative, it is better than ignoring abundance by defining stasis in terms of simple diversity indices (presence-absence) or qualitative "rare-common" categories.

Examples of biological patterns that are also found in fossils include: correlation of local abundance and geographic range, similar alpha diversities in similar environments as living species, right-skewed distributions of geographic ranges, and greater patchiness in time and space in rarer species.

A main question for community stasis is whether it includes rare species. The greater patchiness (abundance fluctuations) of rare species in time and space implies that they are less integrated into the community. We present evidence for this, including stratigraphic patterns of rare species turnover. These patterns are not at variance with a null model that rare species are randomly distributed in space (contrary to the stasis hypothesis). We also show that fossil abundance follows a species-area curve: Stratigraphic samples upsection show the same pattern of species accumulation (same exponents) as the species-area curve. Again, this is within the null model of random species distributions in space.