

Microbial populations hardly ever grow logistically and never sublinearly

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Abstract-

We investigate the growth dynamics of microbial populations, challenging the conventional logistic model. By analyzing empirical data from various biomes, we demonstrate that microbial growth is better described by a generalized logistic model, the θ -logistic model. This accounts for different growth mechanisms and environmental fluctuations, leading to a generalized gamma distribution of abundance fluctuations. Our findings reveal that microbial growth is never sublinear, so they cannot endorse—at least in the microbial world—the recent proposal of this mechanism as a stability enhancer of highly diverse communities. These results have significant implications for understanding macroecological patterns and the stability of microbial ecosystems.

Index Terms- Microbial Growth, Logistic Model, Macroecological Patterns, Environmental Fluctuations

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