

Stochastic colonization of microbe-free hosts

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Macroorganisms are inhabited by microbes. These microbial communities are often called microbiotas. Here we present a stochastic model where the environmental colonization from a microbe-free state and the finite host lifespan lead to multiple steady distributions of the microbiota. The finite host lifespan becomes especially relevant for short-living organisms (e.g. *Caenorhabditis elegans*, *Drosophila melanogaster*, and *Danio rerio*). In this case, multimodal microbial colonization, coexistence of sterile and colonized hosts, and a reduced probability of colonization are observed. Our results suggest a unification of empirical observations around colonization and highlights the influence of ecological drift during the formation of natural microbiotas