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Eco-evolutionary Dynamics of Microbial Communities

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Eco-evolutionary Dynamics of Microbial Communities

Abstract

Microbes form complex communities which have profound effects on host health status. Understanding the evolutionary dynamics of microbial communities is a key step towards the goal of manipulating microbiomes to promote beneficial states. While interactions within a microbial community and between microbes and their environment collectively determine the community composition and population dynamics, we are often concerned with traits or functions of a microbiome that link more directly to host health. To study how traits of a microbiome are impacted by eco-evolutionary dynamics, we recast a classic resource-mediated population dynamic model into a population genetic framework which incorporates traits. Using simple communities as example, we illustrate how natural selection, mutation, and shifts in the environment work together to produce changes in trait values over time.