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Pathogen evolution in finite populations

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The theory of life-history evolution provides a powerful framework to understand the evolutionary dynamics of pathogens. It assumes, however, that host populations are large and that one can neglect the effects of demographic stochasticity. Here, we expand the theory to account for the effects of finite population size on the evolution of pathogen virulence. We show that demographic stochasticity introduces additional evolutionary forces that can qualitatively affect the dynamics and the evolutionary outcome. We will discuss the importance of the shape of the pathogen fitness landscape on the balance between mutation, selection and genetic drift. This analysis reconciles Adaptive Dynamics with population genetics in finite populations. We will also discuss how to expand this theoretical framework to study the effect of demographic stochasticity on multilocus evolution of pathogens.

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