

Abstract

Fisher's geometric model is a simple approach for studying the problem of adaptation in complex organisms. Its basic premise is that adaptation requires simultaneous optimization of multiple phenotypic traits, and that most mutations will affect several traits at once. The original purpose of the model was to serve as an argument for gradualistic evolution driven by selection of small beneficial mutations. Since then, it has been applied to a multitude of questions, including the distribution of mutational effects, the characteristics of "adaptive walks", and the "cost of complexity". However, the majority of models have been based on an extremely simplified ecological scenario: a one-time change in the selectively favored trait combination. Here, I present an analysis of Fisher's model in the alternative case of gradually and constant environmental change. This approach makes it possible to study the interplay of environmental and genetic constraints in shaping adaptive evolution at the organismal level.