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Evolution of maternal effects in discrete random environments.

Abstract: When the environment varies from generation to generation, several alternative mechanisms can allow populations to maintain high fitness. We consider a scenario where the environment follows a Markov process with two environmental states. We consider genetic strategies that allow for transgenerational plasticity, diversifying bet-hedging, or epigenetic inheritance with environmental modification. For transgenerational plasticity and bet-hedging we can calculate the geometric mean growth of a genotype. Using this approach, we show that an ancestor that produces a single phenotypic type can first evolve transgenerational plasticity, and only later evolve a bet-hedging strategy. For epigenetic inheritance, we define a random product of matrices to determine the growth rate of an epigenetic strategy. A small set of parameters favor epigenetic inheritance over genetic strategies.