

SMBE 2017

Open Symposium

POB-361

Phenotypic plasticity promotes recombination modification in periodic environments

Davorka Gulisija ^{1,*}, Joshua B. Plotkin ¹

¹University of Pennsylvania, Philadelphia, United States

Abstract: While theory offers clear predictions for when recombination will evolve in changing environments, it is unclear what natural scenarios can generate the necessary conditions. The Red Queen hypothesis provides one such scenario in natural populations, but it requires interaction with antagonistic species such as host-parasite systems. We present a novel scenario for the evolution of recombination in finite populations: the genomic storage effect due to phenotypic plasticity. Using an analytic approximation and Monte Carlo simulations we demonstrate that balanced polymorphism and recombination evolve between a target locus that codes for a seasonally selected trait and a plasticity modifier locus that modulates the effects of target-locus alleles. Unlike in prior models, evolution of recombination by this plasticity effect does not require antagonistic inter-specific interactions or a steady influx of mutation, and it occurs even when a single target locus expresses a trait under selection. Furthermore, we show that selection will suppress the recombination rate among multiple polymorphic target loci, even in the absence of epistasis among them, which produces a cluster of linked loci under selection. These results provide a novel biological scenario for the evolution of recombination and supergenes.

Disclosure of Interest: None Declared

Keywords: None