

Abstract for an Invited Paper
for the SES11 Meeting of
The American Physical Society

Accumulation of beneficial mutations in low dimensions¹

JAKUB OTWINOWSKI, Emory University

When beneficial mutations are relatively common, competition between multiple unfixed mutations can reduce the rate of fixation in well-mixed asexual populations. We introduce a one-dimensional model with a steady accumulation of beneficial mutations. We find a transition between periodic selection and multiple-mutation regimes. In the multiple-mutation regime, the increase of fitness along the lattice bears is similar to surface growth phenomena, with power-law growth, saturation of the interface width, and KPZ universality class exponents. We also find significant differences compared to the well-mixed model. In our lattice model, the transition between regimes happens at a much lower mutation rate due to slower fixation times in one dimension. Also, the rate of fixation is reduced with increasing mutation rate due to the more intense competition, and it saturates with large population size.

¹Supported by the US National Science Foundation through Grant No. DMR-0812204.