Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Spatial population genetics in a petri dish KIRILL KOROLEV, MIT, JOAO XAVIER, MELANIE MULLER, NILAY KARAHAN, OSKAR HALLATSCHEK, KEVIN FOSTER, ANDREW MURRAY, DAVID NELSON — The evolution of natural populations involves more than mutations followed by natural selection: Stochasticity and spatial migrations are also important. The effects of fluctuations and spatial structure become especially pronounced when organisms expand to new territories. The fluctuations are enhanced because the number of organisms at the front of the expansion is typically small, and the spatial structure is more pronounced due to dimensional reduction from two to one spatial dimension (because colonization occurs along the quasi-one-dimensional periphery of the population). The interplay of fluctuations and space leads to spatial segregation of different genotypes, which significantly alters the evolutionary dynamics of the population. We investigate this process by combining theory, simulations, and experiments on microbial expansions on the surface of a Petri dish. In particular, I will discuss how one can use simple microbiology experiments to measure important parameters of microbial populations such as the strength of fluctuations, migration rate, and relative fitness.

Kirill Korolev
MIT

Date submitted: 18 Nov 2010 Electronic form version 1.4