MARK LEWIS, University of Alberta

Genetic consequences of range expansion under climate change

Range expansion is a crucial population response to climate change. Genetic consequences are coupled to ecological dynamics that, in turn, are driven by shifting climate conditions. We model a population with a reaction–diffusion system, coupled to a heterogeneous environment that shifts with time due to climate change. We decompose the resulting traveling wave solution into neutral genetic components to analyze the spatio-temporal dynamics of its genetic structure. Our analysis shows that range expansion under slow climate change preserves genetic diversity. However, diversity is diminished when climate change occurs too quickly. We show that populations with intermediate dispersal ability are best for maintaining genetic diversity. Our study also provides new insight regarding traveling wave solutions in heterogeneous environments. This is joint with Jimmy Garnier (CNRS).