

Adaptive dynamics for one population in two environments

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The adaptive dynamics framework has been used by many authors to describe evolution of organisms in different types of environments. In this presentation, we will focus on a situation where a single pathogen has to adapt to two environments: each environment presents an optimal trait, and exchanges between them exist. From this set up, it is possible to define an Evolutionary Stable Strategy for the pathogen evolution: either it is adapted to the two environments together, or two subpopulations (each adapted to one environment) emerge, or the population adapts to a single environment, or goes extinct. Adding a mutation load will modify this equilibrium. We will further show how the ESS is modified if one environment periodically vanishes: in certain regimes, we recover traits that would be maladapted in a constant framework.

References

- [1] S.Mirrahimi and S.Gandon, *Evolution of specialization in heterogeneous environments: equilibrium between selection, mutation and migration*, Genetics, 2020
- [2] F.Hamel, F.Lavigne and L.Roques, *Adaptation in a heterogeneous environment I: persistence versus extinction*, Journal of Mathematical Biology, 2021

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