Structured populations with size change: strong and weak migration

Josué Corujo Rodriguez*[1]

[1]Institut de Recherche Mathématique Avancée (IRMA) – université de Strasbourg, Centre National de la Recherche Scientifique : UMR7501 – 7 rue René-Descartes, 67084 Strasbourg Cedex, France, France

Résumé

We introduce two models of structured populations with population size change. These are generalizations of the structured coalescent defined by Herbots (1994). We assume that the population size of each island changes according to the same population size change function. One of the main question that arises is: does a change in the population size (affecting the coalescence rates) also affect the migration rates? We propose two models, one where the migration rates varies in time and other where they do not. These models are intuitively defined according to assumptions on the migration rates in the pre-limit discrete-time model. The dynamics of both models are described by continuous-time inhomogeneous Markov chains. We then study the Inverse Instantaneous Coalescent Rate (IICR) functions (see Chikhi et al. (2018)) in these models when the population is structured as a n-island model and for some classical population size change functions: single step population size change, linear size change and exponential size change. We explore the influence of the population size change on the IICR functions in both models and the relation with the real population size functions. In addition, the models we propose can be generalize to arbitrary structured models (stepping stone, continental, for instance).

*Intervenant