

Contribution ID: 185

Type: **Poster Presentation**

Relating explicit spatial structure in population connectivity with biodiversity

Monday, 9 July 2018 19:45 (15 minutes)

One of the challenging questions in Ecology is how spatial structure influences the formation of biodiversity patterns. Here, we explore networks that represent population connectivity including cases where dispersal is symmetric and asymmetric, looking for the relationship between population connectivity network structure and biodiversity patterns therein. In this metapopulation system, we simulate dispersal of individuals based on the probabilities given by a dispersal connectivity matrix, and measure resulting biodiversity.

Difficulties with this approach include the variety of possible network structures and the increasing complexity of networks as they become larger. To deal with this problem, we analyze and compare 1) theoretical networks of relatively small size, which vary in complexity, and 2) realistic large and complex networks that represents coral larval dispersal connectivities in a marine system. Through this approach, we will be better able to understand the possible contribution of geographical structure to biodiversity for metapopulations.

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Session Classification: Poster Session

Track Classification: Ecology