Ecology and Spatial Relationships

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Contents

Overview

- Zipf's law and its formation
  - Zipf's law without fine-tuning: static mesoscopic
  - Stationary distribution of dynamical processes for the sizes of groups of individuals
    - mesoscopic: cities
    - microscopic: individuals
- Gibrat's law and Taylor's law

To maintain biodiversity

Spatial Structures of a System

- The spatial structure of a system constrains
  - who interacts with whom (interaction partner)
  - who acquires new traits from whom (role model)
- a spatial structure promotes cooperation (spatial reciprocity) when interaction partners overlap role models.
- strong social ties might hinder, while asymmetric spatial structures for interaction and trait dispersal could promote cooperation.

An analytical formula to predict when natural selection favors cooperation where the effects of a spatial structure are described by a single parameter