MetacommunityDyanmics.jl: A virtual laboratory for simulating species interaction networks across space and time

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Abstract: A work in progress manuscript.

MetacommunityDynamics.jl Manuscript – outline

Introduction

- What is a metacommunity?
- Why do we need software to simulate metacommunities?
- What can other people do with this software?
- What does the rest of this paper look like?

Methods

Outline of theoretical framework used to represent metacommunity dynamics

- Metacommunity paradigms (Species Sorting, Mass-Effect, Neutral, Patch Dynamics)
- Velland 2010 — fundemental mechanisms (dispersal, speciation, selection, drift)

Outline of software structure

The species pool and the metaweb

Landscape and dispersal structure

The Metacommunity Tensor

- Abstract dynamics model / difference map
- space/time/species axes

Results

Use-case examples.

1. Co-evolution of plant-pollinator interaction netowrks

2. Occupancy of food-webs in a landscape
3. Invasive vs. native plant in a landscape
4. How does landscape structure effect species richness?
5. Disease spillover interaction networks

Discussion

What next for the software?

- parameter estimation from data
- scalable/parallelizable

How can this be applied by others

References