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

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Abstract: A work in progress manuscript.

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MetacommunityDynamics.jl Manuscript – outline

1

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?

2

Methods

2.1. 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)

2.2. Outline of software structure

(2.2.1) The species pool and the metaweb

(2.2.2) Landscape and dispersal structure

(2.2.3) The Metacommunity Tensor

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

3

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

4

Discussion

What next for the software?

- parameter estimation from data
- scalable/parallelizable

How can this be applied by others

5

References