

Assembly and Disassembly of Ecological Networks



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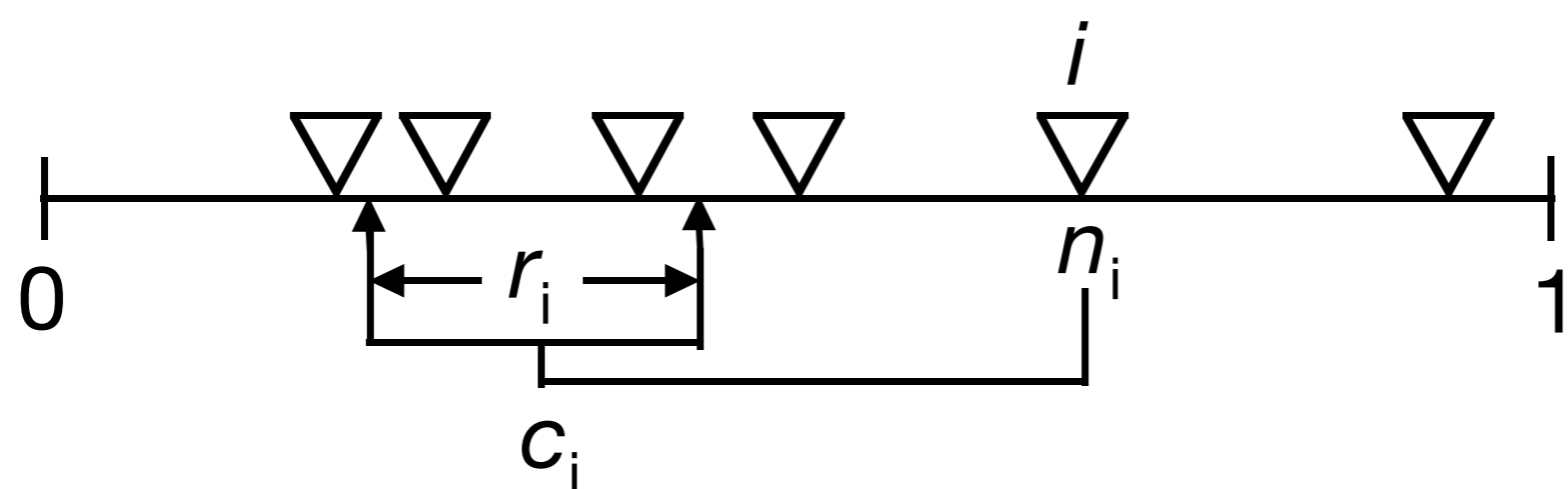
Are space, evolution, and phylogenetic relatedness important processes influencing assembly dynamics of ecological communities?

What are the consequences of environmental changes (e.g. habitat loss) on species interaction networks?

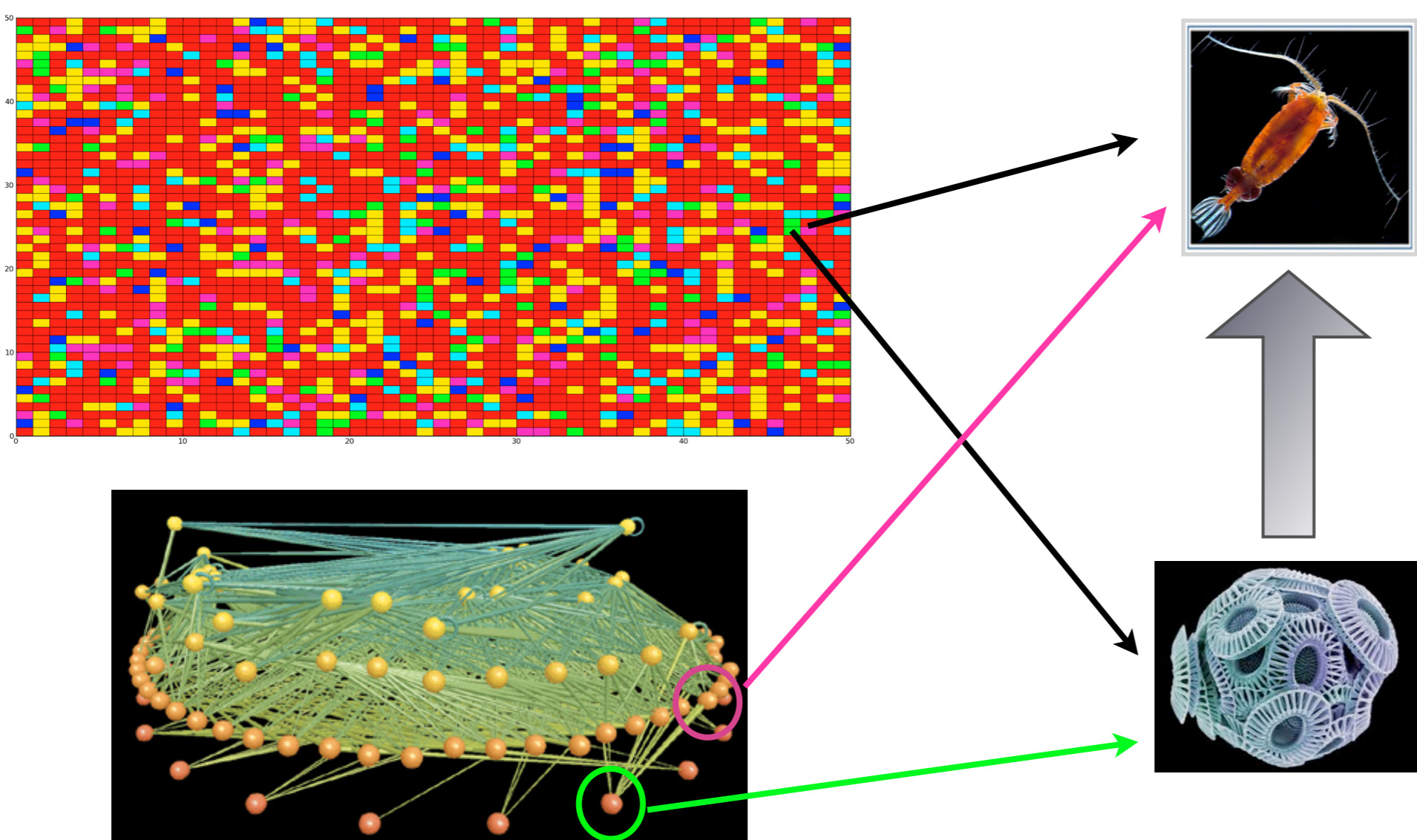
Do assembly and disassembly of species interaction networks follow similar trajectories?

I. Approach

- (i) We employ the niche model to generate the initial network of possible (multi)trophic and mutualistic interactions

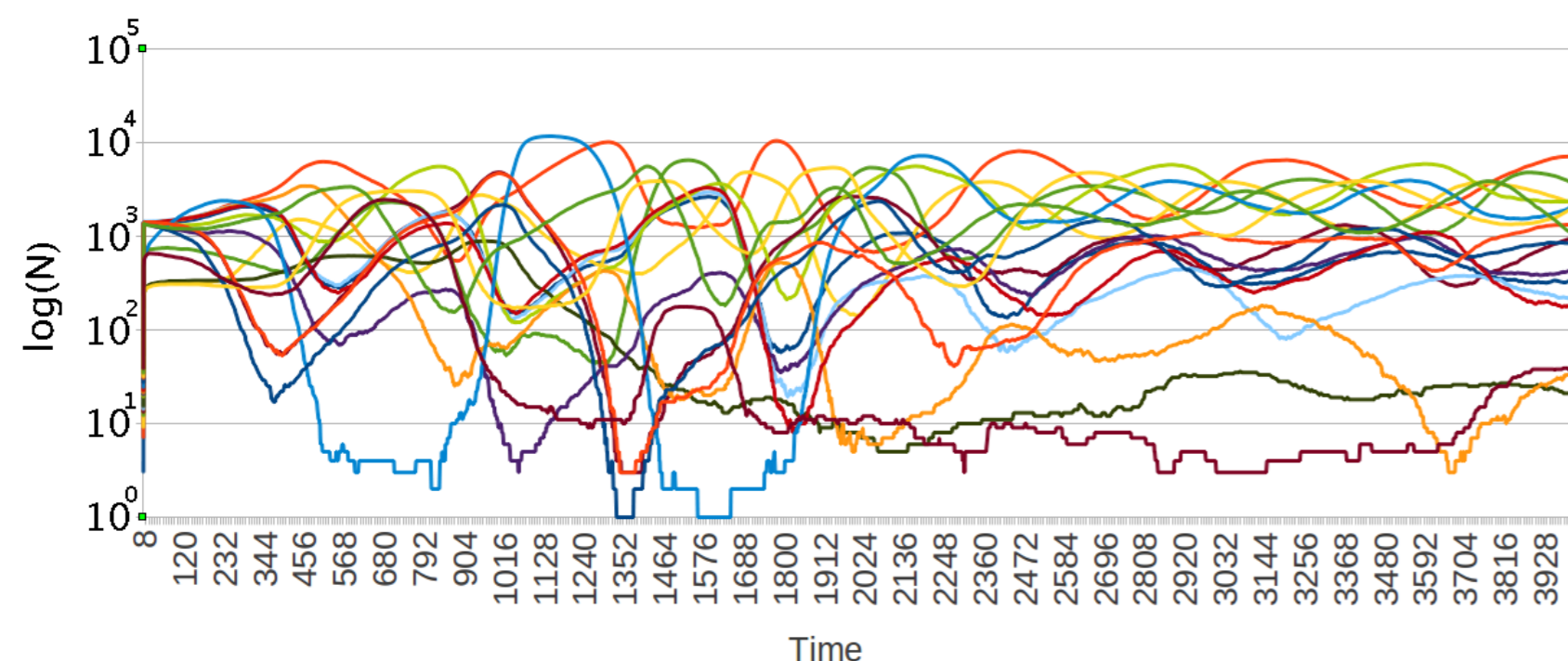


- (ii) An individual-based, spatially explicit simulation model is then applied to obtain the actual species interactions and the corresponding population dynamics (i.e. interactions are shaped by space)

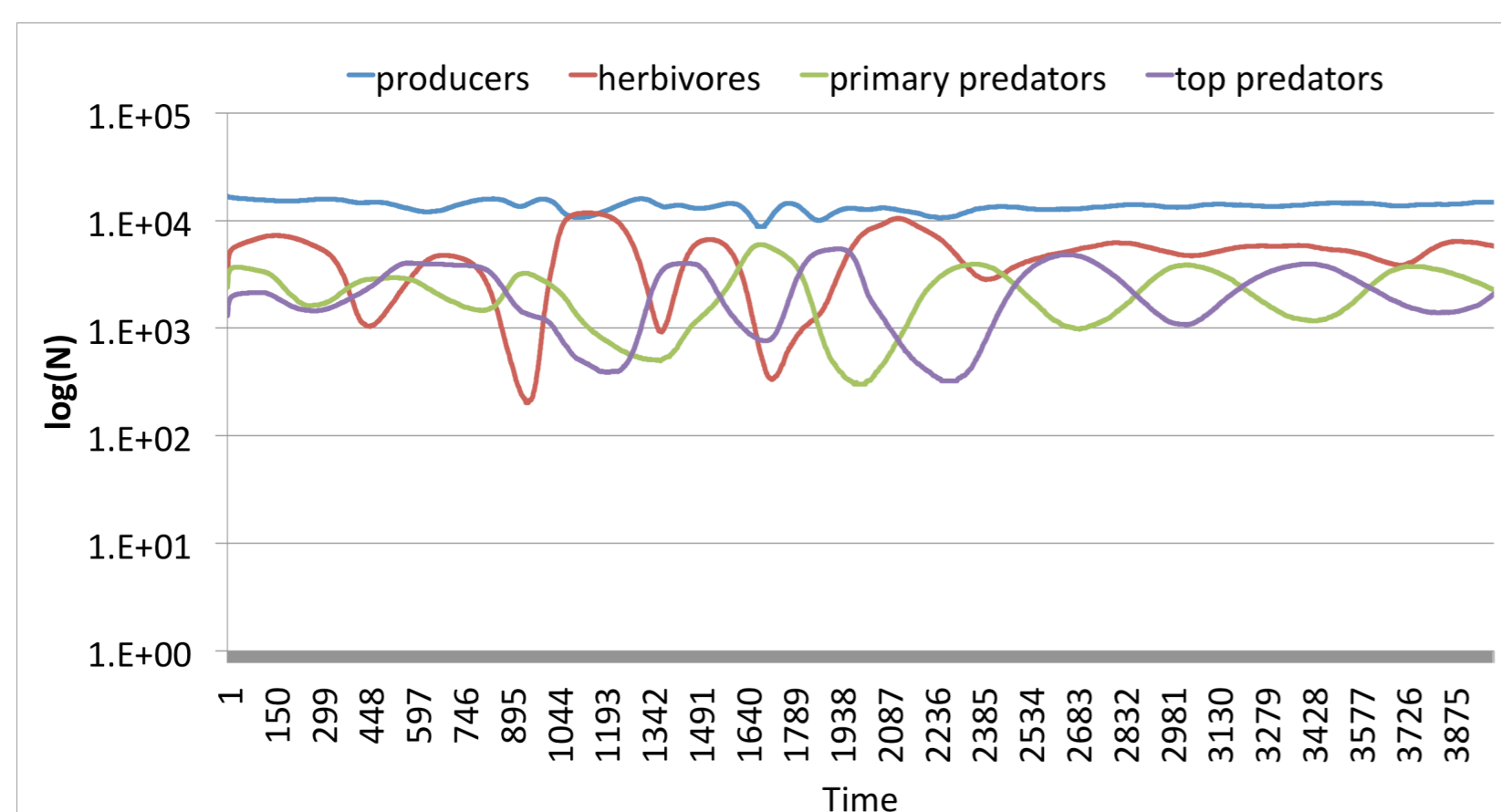


II. Preliminary results

- (i) Fluctuating population dynamics at the species level, but...

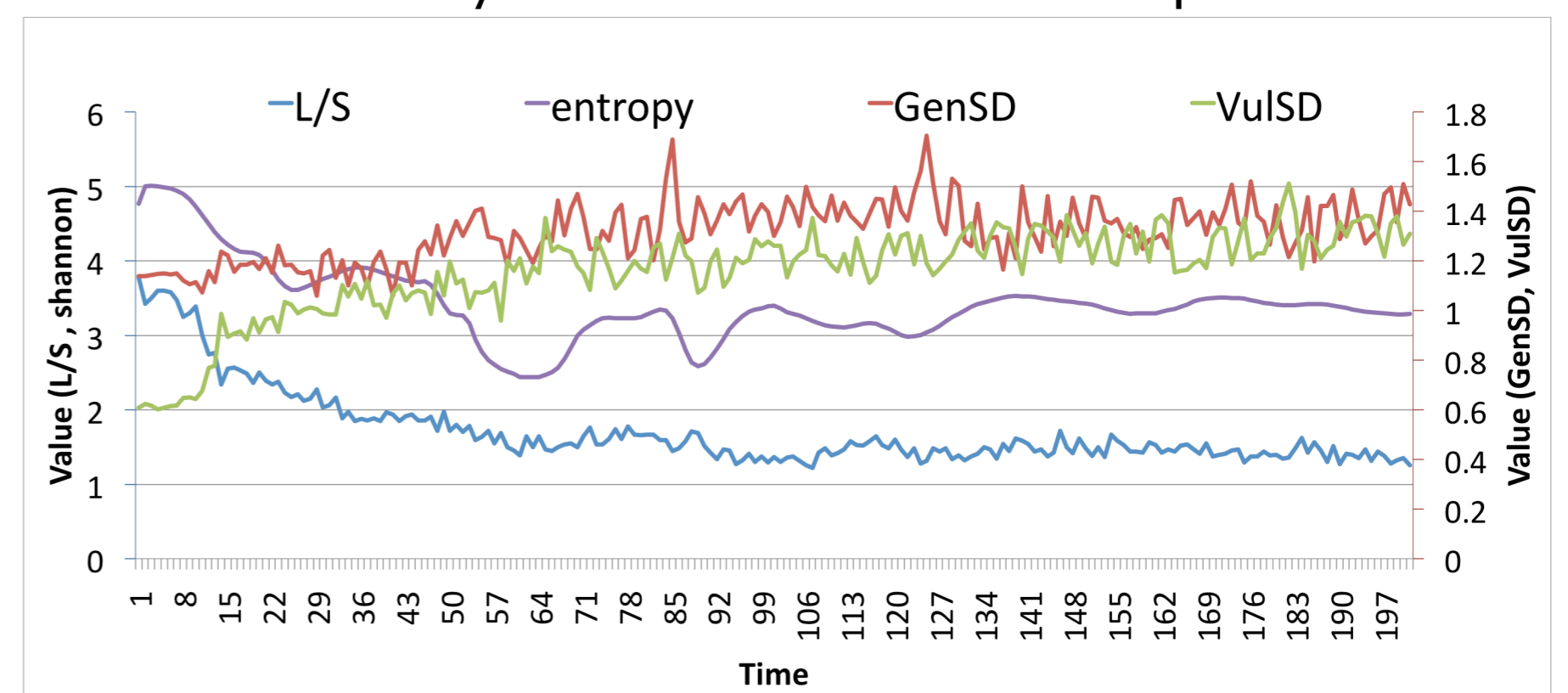


- (ii) ...with more stable dynamics within trophic levels



II. Preliminary results (cont.)

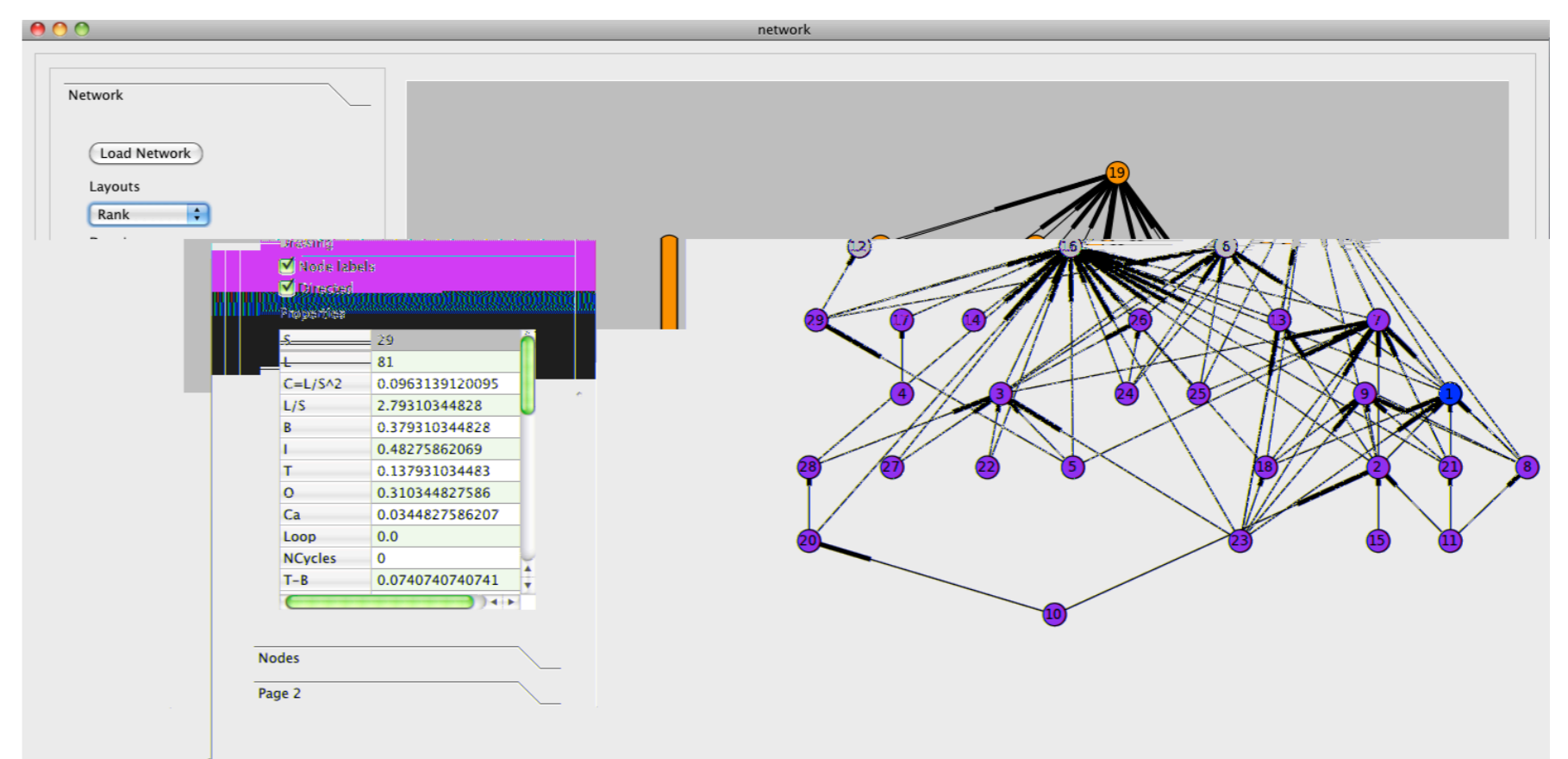
- (iii) Several network properties have been explored, which display constancy after the initial transient period



- (iv) We have a model able to reproduce fluctuating population dynamics and network assembly processes where perturbations can be applied to look at disassembly dynamics

III. Expected outcomes

- (i) A software application for performing real time in-silico species removal experiments where network properties can be compared between assembly and disassembly



- (ii) To determine the role of spatial processes and differences among individuals in shaping species interaction networks.
- (iii) To develop a theoretical assembly framework that allows for antagonistic and mutualistic interactions to be considered and study their contributions towards community persistence

IV. Exciting ongoing work

- (i) Analyse the effects of habitat loss on simulated communities before and after initial transient dynamics
- (ii) Investigate the relevance of evolution for disassembly through invasion experiments from species belonging to the regional species pool (sharing evolutionary history) vs species from outside the species pool in the niche model