

Yansong Zhang

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EDUCATION

East China Normal University, China

Sept. 2021 - Jun. 2024

M.S. in Community Ecology

- GPA: 3.58/4.00
- Dissertation: Temporal dynamics of Grime's CSR strategies in a 65-year old-field succession (pending)
- Supervisor: Prof. Shaopeng Li (Website: <https://liecology.com/>)

Hohai University, China

Sept. 2017 - Jun. 2021

B.S. in Environmental Science and Engineering

- GPA: 4.53/5.00 (rank: top 10%)
- Dissertation: Effects of algal-supported ferrous sulfide on the removal of heavy metals from water (2021 Outstanding Undergraduate Thesis Award in Hohai University)
- Supervisor: Prof. Jun Wu

RESEARCH INTEREST

Functional traits, Community assembly, Community dynamics, Species coexistence, Biological invasion

RESEARCH PROJECTS

1. Exploring the Temporal Dynamics of Grime's CSR Strategies over Succession

- A central prediction of Grime's CSR strategy scheme is that plant communities shift from ruderal (R) strategy in early stages to stress-tolerance (S) strategy in later stages of secondary succession. However, previous evidence for this prediction has relied on short-term snapshots or space-for-time substitutions, potentially biasing our understanding of successional dynamics.
- We utilize data from the Buell-Small Succession Study, the longest continuous study on post-agricultural succession, to directly assess temporal changes in Grime's CSR plant strategies. We found expected behaviors for R and S strategies, while C strategies remain remarkably consistent over 60 years. These changes were further decomposed into functional groups turnover vs intra-group strategy variability effects. Notably, we revealed contrasting shifts in ecological strategy between native and exotic species over succession, shedding light on the role of CSR strategies in mitigating the impact of invasions over time.
- My role: collected functional traits data, compiled CSR scores, analyzed the data, wrote first draft of the manuscript.

2. Understanding Community Assembly Mechanisms through Local Community Dynamics

- Unraveling the relative importance of deterministic and stochastic processes in the assembly of local communities is a central issue in ecology. Although it is generally accepted that their contributions can be quantified by coupling metacommunity composition (phylogenetic/functional) data and null models of beta diversity, there are several intrinsic limitations of this approach. A significant constraint lies in the fact that the inferences drawn across this framework rely on a static perspective: metacommunity patterns based on a single snapshot in time, neglecting the local community dynamics (e.g., colonization and extinction events) over time.
- Our goal is to combine simulation and empirical data to investigate the local community assembly rules by considering colonization and extinction events. I asked whether different (e.g., deterministic and stochastic) colonization and extinction processes shape similar metacommunity phylogenetic/functional patterns to challenge and expand upon the existing framework.
- My role: handled the community dynamics simulation in our ongoing project.

3. The effect of phylogenetic distances on biological invasion at different temperatures: a microcosm study of Darwin's naturalization conundrum

- Darwin's naturalization conundrum describes the paradox that the relatedness of invaders to native residents could either promote or hinder invasion success. Because different studies often generated mixed results, the resolving of this conundrum remains as a major challenge. Here, we propose a new hypothesis that environmental conditions determine the relationship between invader-native phylogenetic distance and invasion success.
- To test this idea, we use bacterial microcosms as model systems to compare the invasion outcome at different temperatures. By analyzing the relationships among invader-native phylogenetic distances, functional traits dissimilarities, niche differences, and relative fitness differences, quantifying and distinguishing the influences of environmental filtering and interspecific competition, we aim to reveal how invader-native ecological differences determine invasion outcome. We found a consistent positive correlation between phylogenetic distance and ecological dissimilarity with invasion success despite temperature change.
- My role: performed the laboratory microcosm experiments.

PUBLICATIONS

1. Zhang YS, Meiners SJ, Yao Q, Meng YN, Jiang L& Li SP. Temporal dynamics of Grime's CSR strategies in a 65-year old-field succession (in preparation, *we have submitted a proposal and subsequently received an invitation to submit a full paper to *Ecology Letters*. This offers the possibility of our work being published as a Letter paper within the special issue of *Ecology Letters* titled "Ecological & Evolutionary Insights from Very Long-Term Studies".*)

2. Yu WB, Li Y, Zhang YS, Zhao GM, Li SP. Ecological dissimilarity promotes biological invasion despite the temperature change (in preparation)

HONORS & AWARDS

The Best Speaker in Guanghua Academic Forum of East China Normal University, 2023

Outstanding Undergraduate Thesis Award of Hohai University, 2021

3 years of Academic Excellence Scholarship of East China Normal University, 2021-2023

4 years of Academic Excellence Scholarship of Hohai University, 2018-2021

Honorable Mention of The International Mathematical Contest in Modeling (MCM), 2020

First-Class Prize in the Jiangsu Division of China Undergraduate Mathematical Contest in Modeling, 2019

Exceptional team in Hohai University's summer social practice activities, 2018

EXPERIENCE

Selected for speakers of Graduate Forum of the 22nd China Conference on Ecology, Beijing, China, 2023

Selected for the 10th East China Normal University Short Course on "Methods in Ecology", 2023

Selected for attendance at the 21st China Conference on Ecology, Guiyang, China, 2022

SKILLS

Technical skills:

- R, SPSS, MATLAB
- Data collection, cleaning and analysis (e.g., plant functional traits data)
- Field work (i.e. plant community survey, soil sampling, plot construction) and laboratory microcosm experiments

Language:

- Native to Mandarin, Fluent in reading and comprehension in English