Yansong Zhang

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Institute of ecology, Peking University, China
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PROFESSIONAL EXPERIENCE

Research Assistant Feb. 2025 - now

Institute of ecology, Peking University, China

- Supervisor: Prof. Zhijie Zhang (Website: https://zhangeco.weebly.com/)
- Working project: Combining microcosm experiments with mathematical models towards the mechanistic rules for species coexistence and priority effect

EDUCATION

East China Normal University, China Sept. 2021 - Jun. 2024

M.S. in Community Ecology

- GPA: 3.58/4.00
- Dissertation: Temporal dynamics of functional traits and adaptive strategies in plant communities during 60 years of old-field succession
  (2024 Outstanding Graduate Thesis Award in ECNU, awarded to top 5% students)
- 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 HHU, awarded to top 5% students)
- Supervisor: Prof. Jun Wu

RESEARCH INTEREST

Species coexistence, Community assembly, Competition, Consumer-resource model, Biological invasion

PUBLICATIONS

1. **Zhang YS**, Meiners SJ, Meng YN, Yao Q, Guo K, Guo WY & Li SP*. (2024). Temporal dynamics of Grime's CSR strategies in plant communities during 60 years of succession. *Ecology Letters*, 27, e14446. Available from: https://doi.org/10.1111/ele.14446

2. Ma SY, Chen SB, …, **Zhang YS**, Zhang ZC, Zhang J* & Li SP*. (2024). What controls forest litter decomposition? A coordinated distributed teabag experiment across ten mountains. *Ecography*, e07339. Available from: https://doi.org/10.1111/ecog.07339

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

RESEARCH PROJECTS

1. Combining microcosm experiments with mathematical models to study priority effect

- The order in which species arrive can have lasting effects on the diversity, composition, and functioning of ecological communities—a phenomenon known as priority effects. While traditionally examined using phenomenological approaches such as Lotka–Volterra competition models, these frameworks are often highly sensitive to environmental context. To address this limitation, we employed a mechanistic consumer-resource model to investigate priority effects. Specifically, we integrated this model with empirical data from pairwise cultures of five phytoplankton species, tested under two contrasting species arrival sequences

and across gradients of phosphorus, nitrate, and ammonium concentrations.

- My role: simulation, experimental data processing and analysis

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

- A key prediction of Grime's CSR strategy framework is that plant communities shift from ruderal (R) strategies in early succession to stress-tolerant (S) strategies in later stages. Despite its importance in succession and restoration theory, this prediction has rarely been tested with long-term data. In this study, we used 60 years of vegetation data from the Buell-Small Succession Study—the longest continuous study of post-agricultural secondary succession in the U.S.—to formally test this idea. By tracking changes across 480 permanent plots in 10 fields, we found that succession trajectories depend strongly on initial site conditions and species origin. Fields with different starting conditions followed distinct CSR patterns early in succession, and alien and native species showed diverging strategies over time.
- My role: collected functional traits data, compiled CSR scores, analyzed the data, wrote first draft of the manuscript and edited the manuscript.

3. Understanding Community Assembly Mechanisms through Local Community Dynamics

- A key question in ecology is how deterministic and stochastic processes shape local communities. Current methods often use phylogenetic or functional diversity with null models, but these are based on single-time snapshots and ignore changes like colonization and extinction over time. To improve this, we combined simulations and real data to study how colonization and extinction influence community assembly. I tested whether different processes (deterministic vs. stochastic) can lead to similar diversity patterns, aiming to challenge and refine current methods.
- My role: handled the community dynamics simulation in our ongoing project.

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

- Darwin's naturalization conundrum highlights a paradox: invaders closely related to native species may be either more or less successful. Mixed results across studies have made this a long-standing challenge. We propose that environmental conditions influence how phylogenetic distance affects invasion success. To test this, we use bacterial microcosms at different temperatures. By examining phylogenetic distance, trait differences, niche overlap, and fitness differences between invaders and natives, we aim to understand how environmental filtering and competition shape invasion outcomes.
- My role: performed the laboratory microcosm experiments.

HONORS & AWARDS

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

- R, SPSS, MATLAB
- Laboratory microcosm experiments and field work (e.g., plant community survey, soil sampling)
- Native to Mandarin, Fluent in reading and comprehension in English (IELTS: 6.5)