# Curriculum Vitae

## INFORMATION

NAME IN FULL: **LINA YAN**

NATIONALITY: PEOPLE'S REPUBLIC OF CHINA

GENDER: Female

LANGUAGES: Chinese (mother tongue), English

UNIVERSITY: Northeast Normal University

**SPECIALITY: Ecology**

HIGHEST ACADEMIC DEGREE: Bachelor Degree [Ecology]

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ADDRESS: Institute of Grassland Science, Northeast Normal University, Key Laboratory of Vegetation Ecology, Ministry of Education, Changchun, Jilin 130024, China

## EDUCATION

**-Sep., 2023-Present: Ph.D., Institute of Grassland Science, School of Life Sciences, Northeast Normal University. Supervisor: Associate Prof. Baoku Shi**

-Jun., 2023: M.S., School of Forestry, Northeast Forestry University.

Supervisor: Associate Prof. Zhili Liu

-Jun., 2020: B.Sc., School of Forestry, Northeast Forestry University

-Major Courses: Forest Ecology, Plant Physiology, Soil Ecology etc.

## PROFESSIONAL/RESEARCH EXPERIENCE

-Jul., 2020 – Aug., 2020, Comprehensive field practice at Liangshui Experimental Forest

-Mar., 2021 – Aug., 2021, Comprehensive field practice at Liangshui Experimental Forest

-Jul., 2022 – Aug., 2022, Comprehensive field practice at Liangshui Experimental Forest

-Mar., 2024 – Aug., 2024, Comprehensive field practice at Jilin Songnen Grassland Ecosystem National Observation and Research Station

## RESEARCH DIRECTION

I am currently finalizing a paper titled "Global soil moisture optima govern autotrophic and heterotrophic respiration." **Our study establishes and quantitatively validates the concept of biome- and texture-dependent optimal soil moisture ($SM^{opt}$) as a universal mechanism governing the divergent responses of autotrophic and heterotrophic respiration.** By integrating a five-year field precipitation manipulation experiment with a comprehensive global meta-analysis of 51 sites, **we provide unprecedented empirical evidence for the global prevalence and drivers of $SM^{opt}$.** This manuscript has been submitted to Ecology Letters.

My Ph.D. research focuses on the mechanisms by which soil salinization and alkalization regulate the temperature sensitivity of soil organic matter decomposition ($Q_{10}$). The specific research activities include:

**(i) Analysis of different soil layers:** We aim to clarify whether salinization accelerates the loss of deep soil carbon and how biotic and abiotic factors regulate $Q_{10}$ across various soil layers.

**(ii) Microbial community acclimatization:** We will study the "acclimatization" effects of long-term salinization stress on microbial communities and explore how soil microbial composition adapts to long-term salinization and its impact on $Q_{10}$.

**(iii) Carbon source input simulations:** $\delta^{13}C$-labeled glucose solutions will be added to simulate plant-derived carbon inputs into the soil. This will help us understand the impact of these inputs on the $Q_{10}$ values of both existing soil organic matter and newly added organic matter.

## CERTIFICATE

**English Proficiency**: College English Test [CET6 - 432] (Full Mark: 750)

**Outstanding Graduate Student Award** (Top 2%)

*Northeast Forestry University,* 2023

**National Scholarship for Graduate Students**

*Northeast Forestry University,* 2022

**Excellent Graduate Student Award**

*Northeast Forestry University,* 2023

**"Exemplary Student" Honorary Certificate**

*Northeast Forestry University,* 2023

**University-Level Outstanding Undergraduate Thesis Award** (Top 5%)

*Northeast Forestry University,* 2020

## PUBLISHED PAPER

1. **Lina Yan**, Ziyan Zhang, Guangze Jin, Zhili Liu*. Variations of leaf NSCs in an evergreen coniferous species: Needle age and phenology dominate over life history. Ecological Indicators, 2022, 136: 108685.

# Team Introduction

## I. Representative Achievements

### 1. Mechanisms of Extreme Drought on Soil Organic Carbon

By analyzing data from 19 global sites, the team revealed how the aridity index regulates the response of soil organic carbon (SOC) and its components (particulate organic carbon, POC; mineral-associated organic carbon, MAOC) to extreme drought. Key findings include:

- In humid regions (aridity index > 0.65), extreme drought reduced SOC and POC concentrations by 7.9% and 15.9%, respectively, while MAOC remained unchanged;
- In arid regions (aridity index < 0.65), SOC and its components showed no significant changes.

This research was published in **Science Advances.**

### 2. Mechanisms Maintaining Grassland Ecosystem Multifunctionality

Through long-term field experiments and controlled greenhouse studies, the team systematically investigated the effects of precipitation changes, nitrogen deposition, and grassland utilization (grazing, mowing) on soil element cycling, vegetation productivity, and ecosystem stability. Over 50 papers have been published in journals such as Ecology and Functional Ecology.

### 3. Plant Physiological Ecology and Adaptation

Focusing on phenotypic plasticity and gene expression regulation, the team uncovered transcriptomic adaptive changes in ***Leymus chinensis*** under different soil conditions, providing theoretical support for grassland restoration.

### 4. Strategies for Enhancing Ecosystem Carbon Sink Function

The team found that diversified grazing can enhance grassland multifunctionality by promoting soil carbon sequestration and biodiversity. Related findings were published in **PNAS**.


**[1]** Shi, B., Delgado-Baquerizo, M., Knapp, A. K., Smith, M. D., Reed, S., Osborne, B., ... & Sun, W. (2024). Aridity drives the response of soil total and particulate organic carbon to drought in temperate grasslands and shrublands. Science Advances, 10(40), eadq2654.

**[2]** Shi, B., Hu, G., Henry, H. A. L., Stover, H. J., & Liu, Z. (2020). Temporal changes in the spatial variability of soil respiration in a meadow steppe: the role of abiotic and biotic factors. Agricultural and Forest Meteorology, 287, 107958.

**[3]** Shi, B., Fu, X., Smith, M. D., Chen, A., Knapp, A. K., Wang, C., Xu, W., Zhang, R., Sun, W. Autotrophic respiration is more sensitive to nitrogen addition and grazing than heterotrophic respiration in a meadow steppe. CATENA, 2022, 213: 106207.

**[4]** Wang, C., Zhang, R., Vilonen, L., Qu, Y., Fu, X., Shi, B., ... & Sun, W. (2021). Grazing and nitrogen addition restructure the spatial heterogeneity of soil microbial community structure and enzymatic activities. Functional ecology, 35(12), 2763-2777.

## II. Core Members

### 1. Sun Wei (Professor)

- **Positions:** Doctoral Supervisor, Vice Dean of the Graduate School at Northeast Normal University, Vice President of the Chinese Grassland Society, Secretary-General of the Jilin Ecological Society;
- **Research Interests:** Global change ecology, grassland soil carbon cycling, plant physiological ecology;
- **Honors:** New Century Excellent Talents of the Ministry of Education (2012), Second Prize of Jilin Natural Science Award (2021, ranked first).

### 2. Shi Baoku (Associate Professor)

- **Role:** Core team member and first author of multiple key papers (e.g., the **Science Advances** study);
- **Research Interests:** Dynamics of soil carbon components, grassland ecosystem responses to climate change.

### 3. Collaborating Scholars

The team collaborates with international experts in ecology, such as **Manuel Delgado-Baquerizo** (soil microbiology) and Forest Isbell (biodiversity), to advance multi-site global research networks.

## III. Research Projects and Platforms

- **National Natural Science Foundation Projects:** Leading multiple general projects focused on grassland carbon cycling and global change interactions;
- **Experimental Platforms:** Utilizing the Songnen Grassland Global Change Multi-Factor Control Experiment Platform for long-term ecological monitoring;
- **International Collaboration:** Participating in the Drought-Net global research network, covering 19 experimental sites worldwide.

## IV. Social Impact and Applications

The team's findings provide scientific foundations for ecological restoration strategies in arid regions (e.g., optimizing grazing management and enhancing carbon sink functions). Some research has been incorporated into ecological protection policy-making in Jilin Province.