



# The type and quantity of plant litter influences the plant functional group growth in an alpine meadow



Fujiang Hou\* Zhouwen Ma

State Key Laboratory of Grassland Agro-ecosystems, Key Laboratory of Grassland Livestock Industry Innovation, Ministry of Agriculture and Rural Affairs, College of Pastoral Agriculture Science and Technology, Lanzhou University, China.

\* Corresponding author email: cyhoufj@lzu.edu.cn

## Introduction

- Plant functional group (PFG) diversity in a grassland is an important measure of productivity and health.
- Litter is known to be major driving factors of soil-grass feedbacks in natural grassland. The shift in PFG composition is a significant change that can result many ecological consequences such as litter composition and dynamics.
- However, quantitative tests of their importance in community dynamics are lacking, and their effects on the PFG characteristics are unknown.

## Objective

Our aim was to elucidate the potentially interactive relationships between litter mass and litter species of different stage at PFG characteristics that can provide insights for sustainable management of grasslands.

## Materials and Methods

- The experiment was conducted at an alpine meadow located on the Qinghai Tibetan Plateau (QTP), China. (3500 m a.s.l.)
- We tested three litter types from *Elymus nutans* (En), *Kobresia setchwanensis* (Ks), *Ligularia virgaurea* (Lv) with five levels of litter mass (0, 100, 200, 400 and 600 g/m<sup>2</sup>).
- In Mid-August (peak of growing season). PFG (grasses, sedges, legumes and forbs) coverage, height, aboveground biomass were then measured.

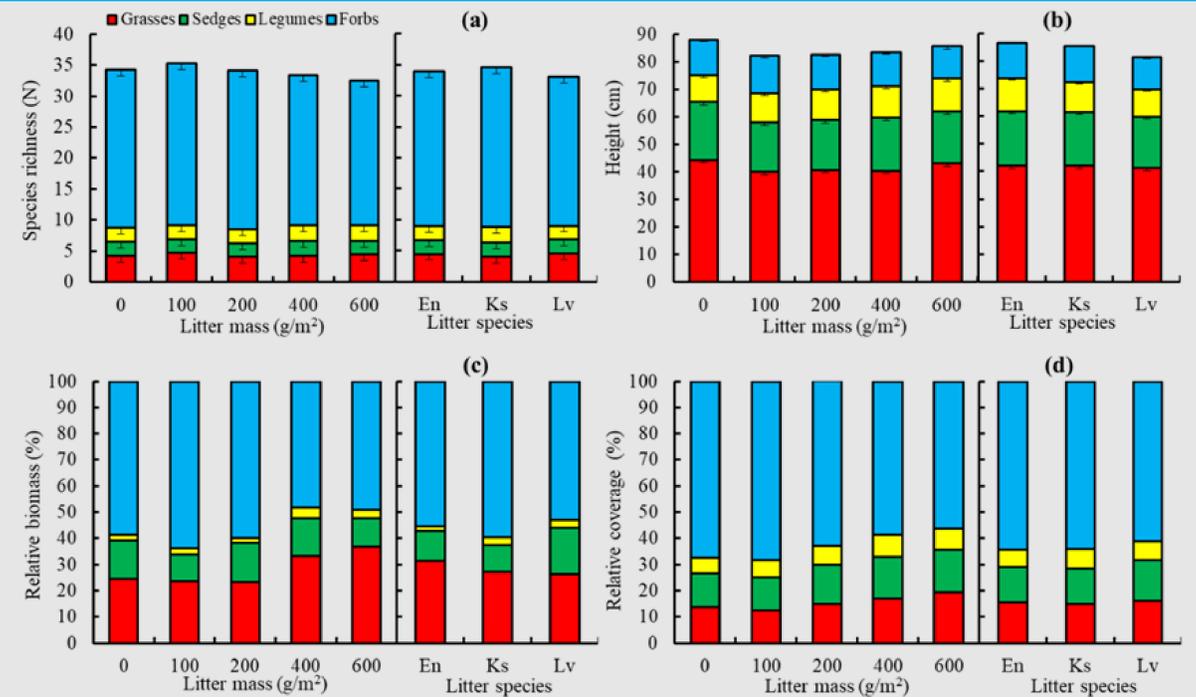


Figure 1. The effects of litter addition on species richness (a), height (b), relative biomass (c), relative coverage(d) of PFG.

## Results

- Forbs species richness decreased with increasing mass of added litter.
- The relative biomass and coverage of grasses and legumes significantly increased with the increasing mass of added litter, while the relative biomass and coverage of forbs significantly decreased with increase litter mass.
- The effect of *Ligularia virgaurea* litter treatment is stronger.

## Conclusions

Our study demonstrates that litter species and mass are major drivers that influences the PFG composition in an alpine grassland, highlighting the importance of litter in maintaining grassland PFG structure and ecosystem functions. Litter dynamics can provide insights for use of litter and improvement of grassland ecosystem.

