

# Seasonal variations of plant species diversity and phylogenetic diversity in abandoned farmland of China's Huang-Huai Plain

Peisen Yan<sup>1</sup>, Xunling Lu<sup>1</sup>, Wanying Li<sup>1</sup>, Jian Zhang<sup>1</sup>, Peikun Li<sup>1</sup>, Yan Li<sup>1</sup>, Kaiyue Wang<sup>1</sup>, and Shengyan Ding<sup>1</sup>

<sup>1</sup>Henan University College of Geography and Environmental Science

March 28, 2023

## Abstract

As urbanization and industrialization continue to advance rapidly in China, the issue of farmland abandonment is becoming more prevalent. Nevertheless, this phenomenon is crucial in protecting plant diversity in agricultural landscapes. This study sought to investigate the seasonal variation patterns of plant diversity in abandoned farmland habitats within the Huang-Huai Plain region. The plant community characteristics during spring, summer, and autumn were examined, and the variations in plant species diversity and phylogenetic diversity were analyzed across the different seasons. Spearman correlation analysis was used to explore the interrelationships among various diversity indices, and redundancy analysis and linear regression were employed to examine the connection between plant diversity indices and key soil environmental factors. The results showed that significant seasonal changes occurred in the plant community characteristics of abandoned farmland in the Huang-Huai Plain, with the number of families, genera, and species being highest in spring, followed by summer and autumn. Similarly, plant species diversity, richness index, and phylogenetic diversity were also higher in spring than in summer and autumn. The phylogenetic structure of plant communities tended to diverge in spring, be random in summer, and be clustered in autumn. The phylogenetic diversity and species diversity indexes were strongly associated, and soil organic matter and ammonium nitrogen were significantly positively correlated with plant species diversity and phylogenetic diversity. This study highlights the importance of considering seasonal and temporal scales when studying plant diversity and provides a theoretical basis for biodiversity conservation and agricultural production in the Huang-Huai Plain of China.

## Hosted file

Main Document.docx available at <https://authorea.com/users/600732/articles/632212-seasonal-variations-of-plant-species-diversity-and-phylogenetic-diversity-in-abandoned-farmland-of-china-s-huang-huai-plain>