

# Intraspecific trait variation of *Phragmites australis* is driven by temperature rather than soil properties.

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## Abstract

Widespread species of *Phragmites australis* has a high degree of intraspecific variation in functional traits along external climatic and environmental gradients. However, the underlying mechanisms of the environmental gradient at regional scale on intraspecific variation and adaptation strategies of species functional traits are still not well understood. The leaf, stem and root traits of *P. australis* in lakeshore wetlands of semi-arid and arid regions in the Inner Mongolia Plateau were measured to reveal the variability of functional traits at regional scales and the influencing factors, and to reveal the ecological adaptation strategies of *P. australis* in different regions through plant economic spectrum. The results showed that variation of functional traits of *P. australis* had a significant latitudinal pattern. Temperature determined the intraspecific variation of the functional traits of *P. australis*, and the influence of soil properties was small. Plant economic spectrum theory was also applicable to the functional traits of various organs and whole plants of *P. australis*, and different ecological adaptation strategies were confirmed across arid and semi-arid regions. This study provides a new understanding of intraspecific variation of functional traits of *P. australis* originates from temperature-mediated climatic differences brought about by sampling geographic locations, rather than the soil properties of the sampling locations and the joint of climate and soil. The utilization and assimilation of resources of *P. australis* were conservative in arid regions, while in semi-arid regions it was an acquisition strategy.

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