# Variation and association of leaf traits of desert plants in the arid area, northwest China

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## Abstract

Characterizing variation and association of plant traits is critical for understanding plant adaptation strategies and community-building mechanisms. However, little is known about the variation in leaf traits and the association between traits in desert plants of different life types. We used principal components analysis, Pearson's correlation, phylogenetic independent contrasts, linear mixed model, and variance decomposition to explore the variation and association of ten leaf traits in 22 desert plants in the arid area. Our results showed that: (1) Interspecific variation in leaf traits contributed more to total variation than intraspecific variation. (2) Intraspecific and interspecific variation in leaf traits were different among different life forms, except for some traits that showed intraspecific variation higher than interspecific in some functional types, other traits with interspecific variation higher than intraspecific variation. (3) Desert plants have a one-dimensional leaf economic spectrum, in which shrubs are a fast acquisitive resource strategy, and herbs are a conservative resource strategy. (4) There were trade-offs between leaf traits, which were influenced by phylogeny. Our results suggest that variation of leaf traits mainly comes from interspecific variation, but intraspecific variation cannot be ignored. In addition, species with different life forms will adopt different ecological strategies to adapt to arid habitats. Therefore, we should study the variation and association of plant traits according to different functional types, in the future.

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