Nitrogen addition affects trait divergence of plant community assembly

February 27 2023, by Zhang Nannan

Mongolia. Credit: Hippopx/CC BY

It is well known that nitrogen (N) deposition can affect plant community

assembly in the temperate desert steppe, thus resulting in changes in local ecosystem functions and species diversity.

A research team from the Northwest Institute of Eco-Environment and Resources of the Chinese Academy of Sciences (CAS) conducted a four-year N addition experiment with eight N addition levels to investigate the underlying plant community assembly mechanisms in the temperate desert steppe of Inner Mongolia.

The researchers investigated species composition and then collected aboveground biomass and measured six soil properties and functional traits. They also examined changes in six trait ranges and trait patterns along experimental N addition gradients.

Their results were published in *Plant and Soil* on Feb. 13.

According to the researchers, environmental and biotic filtering plays important roles in community assembly along N addition gradients in a temperate desert steppe. The effects of environmental and biotic filtering on plant community assembly can be revealed by progressively examining changes in trait ranges and trait patterns along N addition gradients.

High N addition also alters species diversity and composition. In N-rich communities, traits tend to diverge because species with opposite ecological strategies show small differences in their competitive ability and thus coexist abundantly, suggesting that high N addition induces functional trait differentiation and trait dissimilarity drives plant community assembly.

This study contributes to our understanding of the mechanisms underlying the emergence and maintenance of biodiversity in the temperate desert steppe and provides a theoretical basis for the

conservation and sustainable development of ecosystem functions and ecosystem services.

More information: Jingjuan Qiao et al, High nitrogen addition induces functional trait divergence of plant community in a temperate desert steppe, *Plant and Soil* (2023). DOI: 10.1007/s11104-023-05910-1

Provided by Chinese Academy of Sciences