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The role of grazing exclusion by fence in regulating vegetation characteristics and plant diversity in Mongolian rangelands

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Grazing largely affects vegetation dynamic of grassland communities. An intensified grazing will likely lead to grassland degradation. Therefore, to restore degraded grasslands, grazing exclusion by fence might be very helpful. However, the direction and the strength of grazing management effects on vegetation characteristics and plant diversity are currently disputable. In addition, vegetation cover and species richness are often independently examined under different grazing regimes in typical studies. Diversity-cover relationship is not adequately detected in degraded grasslands.

In this study, I aim at understanding effects of grazing exclusion on vegetation characteristics, plant diversity and their relationship. For this, I performed a fencing experiment in three grassland types, namely meadow (since 2009), mountain steppe (since 2013) and dry steppe (since 2013) in Mongolia. Each of three grasslands was set by two treatments: grazing exclusion and freely grazing. Vegetation characteristics were mirrored by vegetation cover and height. Plant diversity was evaluated by indices of species richness, Shannon-Wiener diversity and Pielou evenness.

The empirical results show that grazing exclusion by fence generally increases vegetation height regardless of grassland types. On the other hand, the changing direction of vegetation cover caused by grazing exclusion is not consistent in three grasslands. Fencing decreases species richness and Shannon diversity. While Pielou evenness responds slightly to changes in grazing regimes. Greater species richness benefits an increment of vegetation cover independent of grazing treatments and grassland types.

This study fills the knowledge gap of grazing management effects on vegetation characteristics and plant diversity in Mongolian rangelands. The results clearly demonstrate that grazing exclusion by fence is not an efficient way to restore degraded grasslands. This will also allow to project the impact of changes in land use on ecosystem functioning.