

Effects of Different Grazing on the Typical Steppe Vegetation Characteristics on the Mongolian Plateau

ACADEMIC JOURNAL ARTICLE

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Nomadic Peoples, Vol. 12, No. 2

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Abstract

We studied plant community characteristics of typical steppe vegetation under different grazing systems on the Mongolian plateau of Inner Mongolia in China and the Republic of Mongolia. The different grazing types were defined as four season nomadic, four season rotational, two season rotational and settled grazing. Total cover (per cent), total weight (g/[m.sup.2]) and total plant richness were greater for the four season nomadic and four season rotational compared to the two season rotational and settled grazing. In general vegetation indicators exhibiting less grazing impact by grazing systems followed the following sequence: four season nomadic > four season rotational > two season rotational > settled grazing. There was little difference in estimated grazing capacity of the study areas but large differences in grassland degradation. Therefore, our findings suggest that under the same carrying capacity, four season nomadic and four season rotational grazing have less detrimental impacts on a typical Mongolian steppe vegetation characteristics compared to the settled grazing. We believe that vegetation restoration is also more rapid in the four season rotational systems because there is less trampling by livestock and in settled grazing there is little to no resumption of plant growth. Keywords: Mongolian plateau, grazing, steppe, vegetation, nomads, settlement

Introduction

The Mongolian plateau is located in Inner Mongolia (Peoples' Republic of China) and in Mongolia, and covers 15,665 million [km.sup.2], which accounts for 83.4 percent of the world's grassland (World Resources Institute 2003). The basic landscape, structure and plant composition of the two countries' grassland are similar. The plateau has a typical continental climate with long cold winters, dry windy springs, hot short summers and cool autumns. The main geographical features are forests in the north, mountains and forests in the northwest, grasslands and marshes in the east, while the Gobi desert steppe and semi-desert grasslands account for most of the land in the south. Animal husbandry has been the main industry for centuries, based on the nomadic Mongolian culture.

Grazing impacts on ecosystems can be complex, with both positive and negative effects on plant communities (Aarssen 1997). There has been considerable domestic and foreign research on the diversity of grassland communities under the different grazing systems practised (Zuozhong and Shiping 2000).

The objective of our study was to compare the effects on the plant communities of four contrasting grazing systems currently practised in Inner Mongolia and Mongolia.

Study Areas

Our study areas were two grassland village areas located in adjacent counties of different countries. One study area was in southeastern Mongolia and the adjacent site was in the Inner Mongolia Autonomous Region.

Southeastern Mongolia

The study site was Talabaolige village in Erdunchagan countryside within Suhebater province, with an annual rainfall of 200-220mm, maximum temperature in July of 40 [degrees]C, minimum temperature in January of -39 [degrees]C, at East longitude 115[degrees] 35' 53.2"-115[degrees] 43' 39.6", latitude 45[degrees] 44' 20.8"- 45[degrees] 45' 14.1 ". The village grassland area is 3,390 [km.sup.2],

the total human population 1,047; the stocking rate is 0.12 sheep units per hectare in 2006. Suhebater Province borders on the south with Xilin Gol League in the Inner Mongolia Autonomous Region, China. The altitude is 1,000 to 2,000 metres above sea level.

Inner Mongolia Autonomous Region (China)

The study site was a village in East Wuzhumuqin county in the northeast of Xilin Gol League, with the Mongolian border to the north. Erdunwula village in Wuliyasitai town has an annual rainfall of 200-250 mm, maximum temperature in July of 39 [degrees]C, minimum temperature in January of -40 [degrees]C. ...

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