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Original Article

Key Resource Areas of an Arid Grazing System of the Mongolian Gobi

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Abstract

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Arid grazing systems can behave according to both equilibrium and non-equilibrium models, depending on spatial and temporal scales. Regarding spatial aspect, key resource areas with access to water bodies can indeed be in equilibrium with livestock while rainfall dependent areas can be non-equilibrium. It is important to understand the application range of each of the models, since associated management is different. We studied the plant communities on a Mongolian Gobi site, paying particular attention to the communities connected to the water table. We found evidence that the vegetation structure on the main river's floodplain is shaped by grazing, meaning that it is in the equilibrium model condition. This vegetation type covers 7.61% of our study site. We therefore concluded that from a spatial viewpoint, at least 7.61% of our site behaves according to the equilibrium model.

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Introduction

Degradation of the world's drylands ranks among the greatest contemporary environmental problems. Between 10 and 20% of them are already degraded, and most of this degradation can be attributed to human activities (Millennium Ecosystem Assessment, 2005). Their sustainable use is therefore urgently needed. Since pastoralism is the main use of drylands, it requires an accurate understanding of the relationships between livestock and vegetation (Suttie *et al*., 2005).

During the last decade of the 20th century the two concepts aiming at describing these relations in arid environments, the 'equilibrium model' and the 'non-equilibrium model', have been opposing each other. In the equilibrium model, vegetation and herbivores are assumed to live in a balance in which pasture condition is the result of interactions between grazing and plant primary production. The associated management consists in estimating the amount of forage produced by the concerned pasture, and calculating the number of animals that can be fed on it, *i.e.* its carrying capacity (Vetter, 2005). In the non-equilibrium model, forage production fluctuations due to the precipitation variations inherent to arid climates are so high, that livestock numbers can not track them (Ellis & Swift, 1988). In addition, extensive multi-year droughts regularly lead to massive die-offs,