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## Effects of Alternating *versus* Continuous Grazing on Feed Intake and Performance of Sheep in the Inner Mongolian Steppe, China

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### Abstract

Many studies evaluated the effects of different grazing management systems (GS) on biomass production and the nutritional quality of the rangeland vegetation. Less work has been done on their effects on feed intake and performance of grazing animals. We therefore analysed the effects of two GS on digestibility of ingested organic matter (dOM), organic matter intake (OMI), and liveweight gain (LWG) of sheep in the Inner Mongolian steppe and whether they may differ between grazing intensities (GI) due to differences in the amount and quality of herbage on offer.

A grazing experiment was established in the Xilin River Basin of Inner Mongolia (E 116° 42'; N 43° 38') in 2005 that tested two different GS and six different GI from very light to very heavy grazing. While in the alternating grazing system, grazing and hay-making were alternated annually between two adjacent plots, sheep grazed the same plots every year in the continuous grazing system. In July, August, and September 2009 and 2010, four sheep per plot were selected to determine feces excretion on 5 d per month using the external marker titanium dioxide, while dOM was estimated from fecal crude protein concentrations. Sheep were weighed at the beginning of each month to determine their LWG.

Across both study years, GS did not affect dOM ( $p = 0.101$ ), OMI ( $p = 0.381$ ), and LWG of sheep ( $p = 0.701$ ). However, LWG of sheep decreased with increasing GI ( $p = 0.014$ ). Nevertheless, there were no significant interactions between GS and GI for all measured parameters ( $p > 0.05$ ), indicating that differences between GS were similar at all GI and/or that alternating grazing was not able to compensate for the negative effects of very high GI on animal performance.

In summary, our study showed that despite positive effects on herbage, alternating grazing does not increase dOM, OMI, and hence, LWG of sheep irrespective of GI.

**Keywords:** Feed intake, grazing system, growth rates, ruminant