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Presenter Information

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Rotational and continuous grazing of sheep in the Inner Mongolian steppe of China

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Key words : rotational and continuous grazing, feed intake, digestibility, live weight gain

Introduction The Inner Mongolia steppe of China is traditionally used for grazing. In the last three decades overgrazing by sheep led to a sparse cover of vegetation in winter that enables soil erosion and hence degradation of the grassland, which may be influenced by grazing system. The objective of this study—which is part of the Sino-German DFG research cooperation MAGIM—was to investigate the effects of rotational and continuous grazing on chemical composition of herbage, herbage mass (HM), feed intake and digestibility and live weight gain (LWG) of sheep grazing at a moderate stocking rate of 4.5 sheep/ha on the Inner Mongolian steppe of China.

Materials and methods In the growing season from mid June until mid September in 2005 and 2006 a grazing experiment was conducted comparing a continuous and rotational grazing system with one replication. In the continuous system the sheep remained on one 2 ha plot throughout the season, whereas in the rotational system the plot was subdivided into four paddocks of 0.5 ha each and sheep were moved to the next paddock every 10 days. The stocking rate was 4.5 yearling sheep per ha. The chemical composition of herbage was determined with NIRS and HM was measured using enclosure cages. The intake of organic matter (OMI) was calculated by daily output of fecal OM, estimated by the external marker titanium dioxide, and by OM digestibility (dOM) of herbage ingested by sheep. The dOM was estimated by the fecal crude protein (CP) method (Wang 2007). Intake of digestible OM (dOMI) was calculated by OMI multiplying with dOM, and intake of metabolisable energy (MEI, MJ/d) by multiplying dOMI (kg/d) with 16 (MJ/kg), as described by McDonald et al. (1988).

Results The concentration of CP was lower and NDF higher with rotational than with continuous grazing. The OMI, dOM and MEI with rotational grazing were lower with 1.09 kg/d, 54.9% and 9.6 MJ/d, respectively, than with continuous grazing with 1.31 kg/d, 57.4% and 12.0 MJ/d, respectively. However, the grazing systems did not affect HM and LWG of sheep. The annual precipitation was low with 166 mm in 2005 and 304 mm in 2006 compared with the average value of the last 30 years of 350 mm, which influenced the measured variables in different years.

Table 1 The measured variables in rotational and continuous grazing system in 2005 and 2006.

Item	Rotational grazing		Continuous grazing		SEM	P value	
	2005	2006	2005	2006		GS	Year
OM %	94.3	93.1	94.9	92.7	0.12	0.78	<0.001
CP %	8.1	11.9	8.8	13.0	0.21	0.001	<0.001
NDF %	73.3	69.1	72.0	67.8	0.24	0.016	<0.001
HM, kg/ha	592	490	546	314	35.9	0.14	0.03
OMI, kg/d/sheep	1.03	1.14	1.21	1.27	0.02	<0.001	<0.001
dOM %	53.3	56.5	56.3	58.4	0.14	<0.001	<0.001
MEI, MJ/d/sheep	8.8	10.3	10.9	11.3	0.17	<0.001	<0.001
LWG, g/day	68	84	62	81	2.53	0.41	0.01

Conclusions The results based on these two years showed that the grazing system affected quality of feed, digestibility and intake in sheep grazing on the Inner Mongolian steppe, but the LWG was not affected. Further studies are required in years with mean precipitations before final evaluation of the grazing systems can be made.

References

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