

Relationship between live weight gain of Tibetan sheep and available pasture in Qinhai-Tibetan Plateau

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Introduction

Overgrazing is a universal phenomenon on the Qinghai-Tibetan Plateau, which results in 90% of the alpine meadow grassland being degraded (Gao and Hou 2011). As well, animal productivity of the grassland is becoming lower because of the yearly continuous grazing. Improved grazing management will play a key role in the sustainable use of alpine meadow grasslands.

Methods

The study was conducted at the Qinghai-Tibetan Plateau Experimental Station of Pastoral Agriculture, Lanzhou University (35°58'N; 101°53'E). Mean annual temperature is 1°C and mean annual rainfall is 650 mm (Zhang *et al* 2012; Liu *et al* 2012). There were six grazing treatments (four rotational grazing treatments H-H, H-L, L-H, and L-L, and two continuously grazing treatments C and TR), that were replicated three times. The rotational grazing treatments were combinations of stocking rates on warm season pasture (WSP, July to September) and cool season pasture (CSP, October to December). H-H was high stocking rate (HSR – 8 sheep in 0.5ha) in both WSP and CSP, H-L was HSR in WSP and low stocking rate (LSR – 8 sheep in 1 ha) in CSP, L-H was LSR in WSP and HSR in CSP, and L-L was LSR both in WSP and CSP. The C and TR treatments continuously grazed the same pasture during the whole grazing period with 8 sheep grazed in 2 ha of pasture for C, while TR had 8 sheep in 1 ha (this is the typical ranch stocking rate). Aboveground biomass was monitored by using 12-24 quadrates of 0.25 m² in each pasture for every ten days during grazing. The Tibetan sheep were individually weighed monthly.

Results

In WSP, live-weight gain increased with the increasing available pasture, except for 'L', which exhibited the opposite trend (Fig. 1). In CSP, for all the treatments, live-weight gain increased with the pasture supply increasing, with H-H and L-H more significant than others (Fig. 2). The point of intersection of the trend lines and x-axis indicates when sheep began to lose weight. Sheep began to lose weight in the order of H-H<L-H<TR<H-L<L-L<C (Fig. 2).

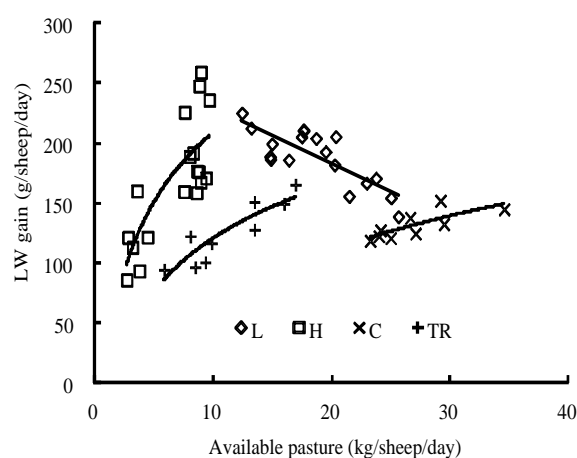


Figure 1. Effect of available pasture on live-weight (LW) gain of sheep under different treatments over three years grazing in WSP.

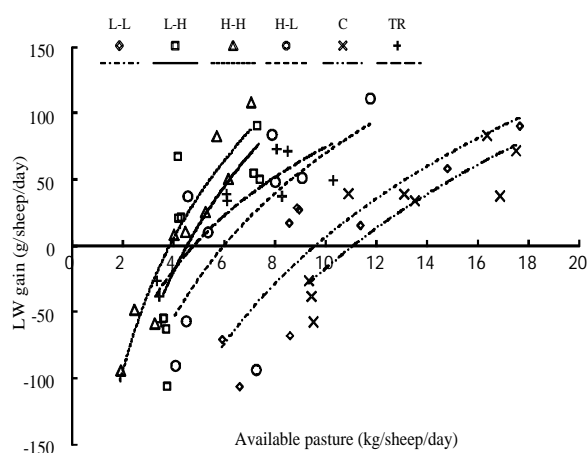


Figure 2. Effect of available pasture on live-weight (LW) gain of sheep under different treatments over three years grazing in CSP.

Conclusions

In terms of our three-year grazing experiment, seasonal rotational grazing with appropriate stocking rate provides an opportunity for improving the animal productivity of alpine meadow grassland on the Qinghai-Tibetan Plateau.

Acknowledgments

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