The effect of stocking rate and lamb grazing system on sward performance of *Trifolium repens* and *Lotus corniculatus* in Uruguay

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Introduction Lambs have a great potential to diversify and stimulate meat and wool production and economical returns within the industry. The main objective of this study was to evaluate different feeding and management alternatives for the production of high quality wool and meat as well as their effects on sward characteristics in the Basaltic region of Uruguay.

Materials and methods The experiment was carried out from May 22 till September 10, 2001, using a two year old mixed sward of *Trifolium repens* (cv. LE Zapicán) and *Lotus corniculatus* (cv. San Gabriel) grazed by 60 Corriedale lambs (8 months of age; 27 kg initial liveweight). The effects studied were stocking rate (SR; 12 and 24 lambs/ha) and grazing system (GS; continuous, CG; strip, SG; and 7 days rotational grazing, 7G). The experimental area was 3.68 ha, divided into 6 plots. The variables measured were (pre and post grazing): a) on sward (each 14 days): herbage mass (ton DM/ha -DM-, ton green DM/ha -GM- and ton green leaf DM/ha -GL-), sward height (cm, H), botanical composition (BC) and nutritive value (NV); and b) on animals (each 14 days): liveweight (LW) and LW gain (LWG); and c) on carcasses (at slaughter): cold weight (CCW) and fat cover (GR). The design was a complete randomised block arranged in a factorial structure.

Results Before and after grazing, the increased SR reduced DM and GM and H (Table 1; $P<0.01$) without affecting NV and BC. GS had a significant effect ($P<0.01$) on sward variables (DM and GM and GL and H) having in general, higher values for CG, and lower and similar for SG and 7G, particularly after grazing. BC and NV of post grazing forage were not affected by GS. Overall, SR had higher effect than GS on the sward characteristics. As the experiment progressed DM and H values remained very stable, evolving into a sward dominated by *Trifolium repens* with a substantial increase in NV. SR affected LWG (210 vs. 168 g/d, $P<0.01$), final LW (50.0 vs. 45.3 kg, $P<0.01$), CCW (23.4 vs. 20.9 kg, $P<0.01$) and GR (16.7 vs. 11.9 mm, $P<0.01$) for 12 and 24 lambs/ha, respectively. GS influenced LWG (197, 191 and 180 g/d, $P<0.01$) and final LW (48.5, 47.8 and 46.6 kg, $P<0.05$), for CG, 7G and SG, respectively. CG showed higher CCW (23.2 vs. 22.3 and 21.0 kg, $P<0.01$) and GR (17.1 vs. 14.2 and 11.6 mm, $P<0.01$) compared with 7G and SG. The increase in SR did not alter wool production and quality, but reduced CCW and GR and boneless leg. Implementation of more controlled grazing systems produced a progressive reduction in LWG and LW, without effecting wool production and quality. Rotational grazing systems produced lighter carcasses with low fat, without modifying the other evaluated carcass characteristics. Within the range of SR used and the sward maintained during this short fattening period, the implementation of a more controlled grazing system would not be justified biologically and economically.

Table 1 Effects of SR and GS on sward characteristics (pre and post grazing)

	Variables	SR			GS				SR*GS						
		12	24	P	C	S	7	P	12-CG	12-SG	12-7G	24-CG	24-SG	24-7G	P
Pre	DM (t DM/ha)	2.42a	2.13b	**	2.15b	2.40a	2.28ab	*	2.37ab	2.61a	2.28b	1.93c	2.20b	2.27b	*
	GM (t DM/ha)	2.12a	1.85b	**	1.83b	2.16a	1.97b	**	2.06b	2.32a	1.99b	1.60c	2.01b	1.95b	*
	GL (t DM/ha)	1.00a	0.92b	*	0.86c	1.07a	0.95b	**	0.96bc	1.09a	0.94c	0.75d	1.05ab	0.97bc	*
	H (cm)	15.8a	13.2b	**	11.6c	17.0a	14.9b	**	14.9b	18.3a	14.9b	8.3c	15.6b	15.6b	**
Post	DM (t DM/ha)	2.17a	1.72b	**	2.07a	1.97ab	1.80b	**	2.34a	2.31a	1.86b	1.81b	1.62b	1.74b	**
	GM (t DM/ha)	1.83a	1.39b	**	1.78a	1.60b	1.45b	**	2.07a	1.84b	1.58c	1.49cd	1.36d	1.32d	ns
	GL (t DM/ha)	0.76a	0.57b	**	0.77a	0.64b	0.58b	**	0.88a	0.71b	0.68b	0.66bc	0.57c	0.47d	ns
	H (cm)	10.2a	6.2b	**	11.0a	6.1c	7.4b	**	14.0a	7.6c	9.0b	8.1bc	4.7e	5.8d	**

ns = $P>0.05$; *= $P<0.05$ and **= $P<0.01$. Means with different letters between columns differ significantly ($P<0.05$)

Conclusions This study shows the high productive potential of mixed swards of high nutritive value and stocking rate, where grazing system played a minor role in affecting animal productivity during this short autumn-spring lamb fattening system. All the lambs coming from the different treatments achieved the requirements of the Heavy Lamb Market of Uruguay, producing between 280 and 440 kg of animal liveweight/ha, in a 110 days period, demonstrating the great potential of white clover dominated swards for lamb production in the Basaltic production systems.