Effect of forage legume species and stocking rate of lambs on sward characteristics in Uruguay

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Introduction The sheep industry is a mayor component of the pastoral industries, given its importance for the Uruguayan economy. In the last decade, sheep farmers have been more interested in low cost technologies to enhance productivity and profit. The objective of this study, conducted in the Basaltic region of Uruguay, was to evaluate the effect of legume species and stocking rate of lambs on sward structure, production, composition and nutritive value.

Materials and methods The trial was carried out from May 30 to September 18, 2001, using 128 Corriedale whether lambs 8-9 months of age and 24 kg initial fasted liveweight. Factors evaluated were forage legume species (Spp; *Lotus corniculatus* cv. INIA Draco -D-, *Lotus pedunculatus* cv. Maku -M-, *Lotus subbiflorus* cv. El Rincón -R- and *Trifolium repens* cv. LE Zapicán -TB-) and stocking rates (SR; 8 and 12 lambs/ha). The experimental area was 13.36 ha, divided into two blocks, each divided into eight plots (one per treatment; 8 animals per plot). A 14 days strip grazing system was used. The improved sward was two years old. The evaluated variables, each 14 days, were: a) on sward (pre and post grazing); herbage mass (kg DM/ha -DM-) and sward height (cm -H-), botanical composition (BC), nutritive value (NV); c) fasted liveweight (LW) and LW gain (LWG). The experimental design was a randomised block with a sub-divided plots arrangement.

Results Spp affected significantly (pre grazing) DM, H and BC and NV. Spp did not significantly affect either post grazing herbage mass or NV, but affected H, and BC (Table 1). Low SR compared with high SR gave higher DM production and H, without altering BC. Spp had an important effect on sward characteristics and production. TB had higher forage production, because the plots were dominated by the clover, which resulted in a higher NV and better sward structure. The differences found between D and M in comparison with R can be ascribed to the higher contribution and better vertical distribution of the former species in the sward, which in turn determined differences in the NV forage consumed and lamb accessibility to them. SR had a smaller impact than Spp on sward characteristics. SR caused differences in sward production and tongue accessibility, but it was not sufficiently important to cause important differences in NV. These high levels of production of the Basaltic production systems can be explained by the favourable climatic conditions for pasture growth. Spp affected LWG (176, 182, 150 and 221 g/lamb/day; $P<0.01$) and LW (43.2, 43.9, 40.4 and 48.1 kg; $P<0.01$), for D, M, R and TB, respectively. The higher productivity obtained on TB swards compared with the intermediate position of D and M and the poorer performance of R, are associated with the differences found in DM, H, BC and NV between species. SR significantly ($P<0.01$) affected LWG (193 and 171 g/l/day;) and LW (45.1 and 42.7 kg), The low SR gave higher LWG, but the high SR superior LW, These differences were mainly linked with DM and H variables.

Table 1 Effects of Spp and SR on sward characteristics and nutritive value

	Variable	Spp					SR			Spp*SR
		D	M	R	TB	P	12	8	P	P
Pre graz.	DM (kg DM/ha)	2583ab	2456b	1982b	3125a	*	2449b	2624a	*	ns
	H (cm)	10.8b	7.8c	7.1c	12.9a	**	9.2b	10.1a	*	ns
	Legume leaf (%)	22.5b	25.3ab	13.2c	28.1a	**	22.9	21.7	ns	ns
	Legume stem (%)	26.2a	28.8a	10.4b	30.1a	**	23.2	24.5	ns	ns
	Crude Protein (%)	19.0b	20.5a	18.3c	21.0a	**	19.4	20.0	ns	ns
Post graz.	DM (kg DM/ha)	2398	2376	2153	2335	ns	2187b	2445a	**	ns
	H (cm)	7.6b	5.9c	6.2c	10.2a	**	6.8b	8.1a	**	ns
	Legume leaf (%)	13.7c	19.5b	6.1d	21.5a	**	15.5	14.8	ns	ns
	Legume stem (%)	24.1b	28.6a	8.8c	30.3a	**	23.8	22.2	ns	ns
	Crude Protein (%)	16.0	18.8	14.8	18.1	ns	16.9	16.9	ns	ns

D = *Lotus corniculatus*; M = *Lotus pedunculatus*; R = *Lotus subbiflorus*; TB = *Trifolium* repens; ns = $P>0.05$; *= $P<0.05$; **= $P<0.01$. Means with different letters between columns differ significantly ($P<0.05$).

Conclusions The experimental results indicate the high potential of all the legumes evaluated for lamb production and the high fertility soils of the Basaltic region. *Trifolium repens* cv. LE Zapicán gave the best performance and *Lotus subbiflorus* cv. El Rincón the worst.