Lamb Stocking Rate and Supplementation Effects on Mixed Triticale and Ryegrass Swards Characteristics

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LAMB STOCKING RATE AND SUPPLEMENTATION EFFECTS ON MIXED TRITICALE AND RYEGRASS SWARDS CHARACTERISTICS

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Abstract

An experiment was carried out from 9 June to 22 October 1997, using a *Lolium multiflorum L.* (ryegrass*)* and *Triticosecale Wittmack* (triticale*)* mixed sward grazed by lambs in a rotational grazing system, to determine the effect of stocking rate (SR; 20, 30 and 40 lambs/ha) and supplementation (S; with or without) on herbage production, composition and nutritive value. SR affected significantly before and after grazing herbage mass and sward height, being higher the values of these variables at the lower SR (3232, 2611 and 2345 kg DM ha^{-1}, $P < 0.05$; 2557, 1761 and 1612 kg DM ha^{-1}, $P < 0.01$; 17, 11 and 9 cm, $P < 0.01$ respectively). Increments in SR had an effect on post grazing sward composition, increasing the proportion of ryegrass (32, 36 and 47 %, P<0.05) and decreasing triticale contribution (68, 64 and 55 %, P<0.05) for 20, 30 and 40 lambs/ha. The effect of SR on sward nutritive value was not very clear. Before grazing, S affected significantly herbage mass, being higher the values at the supplemented treatments (2787 vs. 2672 kg DM ha^{-1}, $P < 0.10$). This experiment showed the high potential of forage production and nutritive value of ryegrass and triticale swards for lamb production in the sandy soil region of Uruguay, and the dominant effect of SR, compared to S, on most of the sward variables considered.

Keywords: Sward height, herbage mass, nutritive value

Introduction

The combined effect of some factors during the last decade (low international wool prizes and increased demand for lamb meat with good prizes at the external markets) produced a high interest of Uruguayan sheep farmers for new technologies adapted to different productive situations for enhancing lamb production in their enterprises (Montossi *et al.*, 1999).

Triticosecale Wittmack cv. INIA Caracé and *Lolium multiflorum* cv. LE284 are two forage options very well adapted to the sandy soils, which are dominant in the north-east region of Uruguay. These grasses have been studied in mixed pastures and have demonstrated a very important potential for meat production for the basaltic soils (Montossi et al., 1998).

It is very important to generate more information about the influence of stocking rate and supplementation on sward structure, production, composition and nutritive value of these mixed grasses pastures grazed by lambs.

Material and Methods

This experiment was carried out at ”La Magnolia" Research Unit (latitude 31º45´05” S, 55º 49´05” W), belonging to INIA Tacuarembó Research Station, located in an extensive region of sandy soils in the north-east part of Uruguay.

The mixed sward under study was conventionally sown in April 1997 with 10 kg ha^{-1} of annual ryegrass (*Lolium multiflorum* cv. LE284) and 150 kg ha^{-1} of triticale (*Triticosecale Wittmack* cv. INIA Caracé) and subdivided into 6 plots of about 0.583 ha each one. All plots were also subdivided into four equal sized sub-plots to allow a rotational grazing system (RGS). The experimental area received an initial fertilization of 130 kg ha^{-1} (18-46-46-0) with an additional 150 kg ha^{-1} (46-0-0) after the first grazing period.

One hundred and two castrated Corriedale lambs aging from 9 to 10 months, with a mean liveweight of 22.4 ± 2.3 kg and a body condition score (BCS) of 2.92 ± 0.5 grades grazed the mixed sward in a rotational grazing system from the 9 June to 2 October of 1997. The lambs were divided randomly into six groups according to their initial fasted liveweight and BCS. The supplement used was wheat bran at a daily allowance of 1.2% of liveweight.

The experiment consisted in a completely randomized design with six treatments, resulting from combining three stocking rates (SR: 20, 30 and 40 lambs per hectare) and two supplementation levels (S: with or without).

Herbage mass (HM) and its botanical composition was determined twice a month in each treatment by cutting quadrats to ground level, using an electric shearing handpiece, before and after grazing. The samples were dried in a forced-drought oven at a temperature of 60 to 70 °C until constant weight. In each quadrate, readings of sward surface height (SSH), using a common ruler, were recorded before and after grazing. Additional fresh samples were clipped adjacent to each before grazing quadrat, bulked in each sampling for each treatment and divided into 2 groups of samples to estimate sward botanical composition and nutritive value. All the procedures have been reported by Montossi et al. (1998). Sward results were analyzed using the statistical package SAS (1990) based on a randomized complete design, arranged in a factorial structure, being the main factors: SR (3 levels) and S (2 levels). Treatment means were compared by LSD test.

Results and Discussion

A summary of sward results is presented for the whole experimental period (Table 1). Results show that, before and after grazing, HM and SSH were significantly higher at the lower SR, reducing the proportion of triticale (TT) and increasing for ryegrass (RG) particularly after grazing. The use of S, produced increased HM ($P < 0.10$). Supplementation affected

significantly, the contribution of the different species after grazing, reducing ryegrass proportion (35 vs. 54 %, P<0.01) and increasing triticale contribution (66 vs. 59 %, P<0.1). S did not affect any of the sward nutritive value variables in before and after grazing samples. The proportions (on DM basis) of ryegrass and triticale components changed through time, being 32 vs. 37 % and 68 vs. 62 % at the beginning and at the end of the experiment respectively, showing the complementary productive cycles of both species. The relationships between HM and SSH were; HM = 972.82 + 77.737 SSH, R^2 = 0.48 and HM = 590.04 + 109.52 SSH, R^2 = 0.47 for before and after grazing respectively.

This experiment demonstrated the high forage productive potential, nutritive value and SR capacity of triticale and ryegrass mixed sward for lamb production in the sandy soils region of Uruguay and the dominant effect of SR on sward production and composition compared with supplementation.

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Table 1 - Herbage mass (HM; kg DM ha^{-1}), sward surface height (SSH; cm), proportions (% of DM) of ryegrass (RG), triticale (TT), total green leaf (TGL), total green stem (TGS), reproductive stem (RS), triticale green leaf (TGL), and chemical composition ((% of DM; crude protein (CP), neutral digestible fibre (NDF) and acid digestible fibre (ADF)) for Stocking Rate (SR; 25 and 35 lambs/ha) and Supplementation ((S; with (W) or without (WH)) factors and their interactions before and after grazing.

	SR				S			Interaction
	20	30	40	P[1]	WH	W	P	SR*S
Before Grazing								
HM	3232a	2611b	2345b	**	2672	2787	N.S.	*
SSH	22.6	20.0	18.9	N.S.	20	21	N.S.	N.S.
RG	29	33	35	N.S.	33	32	N.S.	N.S.
TT	71	67	65	N.S.	67	68	N.S.	N.S.
TGL	47	50	53	N.S.	49	51	N.S.	N.S.
TGS	45	47	45	N.S.	47	45	N.S.	N.S.
RS	7.3a	2.3b	1.8b	***	4.5	3.0	N.S.	N.S.
CP	14.6	14.0	14.5	N.S.	14.5	14.1	N.S.	N.S.
NDF	77	76	75	N.S.	75	77	N.S.	N.S.
ADF	41	41	41	N.S.	41	41	N.S.	N.S.
After Grazing								
HM	2557a	1761b	1612b	***	1905	2049	N.S.	N.S.
SSH	17a	11b	9b	***	12	13	N.S.	N.S.
RG	32a	36b	45c	**	41a	34b	***	***
TT	68a	64ab	55b	**	59	66	N.S.	N.S.
TGL	57	53	49	N.S.	51	55	N.S.	N.S.
TGS	40	44	48	N.S.	47	41	N.S.	*
RS	3.7	2.3	2.2	N.S.	2.2	3.2	N.S.	N.S.

Significance = * P<0.10, ** P<0.05, *** P<0.01 and NS = Not Significant
a, b and c = columns within SR and S with different letters are different (P<0.05)