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LAMB STOCKING, GRAZING SYSTEM AND SUPPLEMENTATION EFFECTS ON TRITICALE AND RYEGRASS SWARDS PERFORMANCE IN URUGUAY

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Abstract

An experiment was carried out from 3 of July to 22 of October 1998, using a *Lolium multiflorum Lom.* (ryegrass) and *Triticosecale Wittmack* (triticale) sward grazed by lambs, to examine the effect of stocking rate (SR; 25 and 35 lambs/ha), grazing system (GS; strip and 7 days rotational grazing) and supplementation (S; with or without) on sward structure, production, composition and nutritive value. SR affected significantly pre and post grazing herbage mass and sward height, being higher at the lower SR (3211 vs 2832 kg DM ha^{-1}, $P < 0.01$; 2443 vs 1939 kg DM ha^{-1}, $P < 0.01$; 19 vs 17 cm, $P < 0.01$ and 10 vs 8 cm, $P < 0.01$ respectively), increasing, at the high SR, the proportions of the ryegrass green leaf component, particularly in the uppermost layers of the sward canopy. In comparison with 7 days rotational GS, strip GS resulted in higher post grazing herbage mass, sward height and nutritive value (2387 vs 1996 DM ha^{-1}, $P < 0.01$; 10 vs 9 cm, $P < 0.01$; 62 vs 67 % NDF, $P < 0.01$ and 33 vs 37 % ADF, $P < 0.01$). S increased post grazing herbage mass and sward height (2347 vs 2035 DM ha^{-1}, $P < 0.01$ and 10 vs 9 cm, $P < 0.01$). This experiment showed the high forage productive potential and nutritive value of ryegrass and triticale swards for lamb production in the sandy soil region of Uruguay and the dominant effect of SR on swards variables comparing with GS

and S.

Keywords: Ryegrass, triticale, lamb, sward height, herbage mass, nutritive value

Introduction

Several research studies carried out by INIA showed the potential biological and economical benefits of using different technological alternatives for fattenning heavy lambs in the main extensive (Montossi et al., 1998) regions of Uruguay.

New forage options, highly adapted to the sandy soil conditions of the northeast region of Uruguay, have been recently released by INIA to the local market, being the case of *Lolium multiflorum Lom.* (cv. INIA Titán) and and *X Triticosecale Wittmack* (cv. INIA Caracé). More research studies are needed to study in these grasses, the influence of stocking rate, grazing management and supplementation upon sward structure, production, composition and nutritive value, grazed intensively by lambs.

Material and Methods

From 3 of July to 22 of October 1998, the present study was conducted at "La Magnolia" Research Unit (latitude 31^0 $45^{'}$ $05^{''}$ S, 55^0 $49^{'}$ $05^{''}$ W), belonging to INIA-Tacuarembó Research Station, in an extensive region of sandy soils in central-north Uruguay, South America.

The mixed sward was sown by direct drilling in April 1998 with 15 kg ha^{-1} of annual ryegrass (*Lolium multiflorum* cv. 'INIA Titán') and 150 kg ha^{-1} of triticale (*Triticale secale* cv. 'INIA Caracé) in 8 plots of 0.375 ha. All plots were further sub-divided by electric fences into four sub-plots of 0.094 ha, giving: a) 7 days rotational grazing system (RGS) and b) with extra daily sub-divisions of each sub-plot resulting in a strip grazing system (SGS).

Eighty eight castrated Corriedale lambs, approximately 9 months old with mean liveweight of 23 ± 2.2 kg and condition score (CS) of 1.7 ± 2.2 grades at the start of the experiment, were used. These lambs were divided randomly into eight groups according to fasted initial liveweight and CS, and then assigned to the 8 treatments applied, which resulted of the combination of 3 factors: stocking rate (SR; 25 or 35 lambs/ha), grazing system (GS; RGS or SGS) and supplementation (S; with or without). The supplement used was whole barley grain at a daily allowance of 0.6 % of liveweight/lamb.

Erro! Indicador não definido. Herbage mass (HM), sward botanical composition, sward vertical distribution, and sward surface height (SSH) were recorded according to the procedures described by Montossi et al. (1998).

Sward results were analysed using the statistical package SAS (1990) based on a randomised complete design, arranged in a factorial structure, being the main factors: SR, GS and S at two levels each. Treatment means were compared by LSD test.

Result and Discussion

Sward results are summarised and presented for the entire experimental period in Table 1.

Herbage mass (HM) and sward surface height (SSH) were significantly higher ($P < 0.01$) at the lower SR, before and after grazing, reducing the proportion of ryegrass green leaf (RGL) (Table 1). Before and after grazing, SGS tended to increase HM and SSH and decreased the nutritive value of the forage. Using S, there was a tendency of increasing HM and SSH ($P < 0.10$) and reducing forage nutritive value (e.g. crude protein), associated with the corresponding increments in the proportions of triticale green stem (TGS) and dead component (DC). After grazing, the lower HM and SSH were found in those treatments combining the low SR, SGS and WH, increasing the contribution of ryegrass components and reducing those of triticale. The relative proportions (on DM basis) of ryegrass and triticale components changed through time, being 40 vs 19 % and 50 vs 5 % at the beginning and the end of the experiment, respectively, showing the complementary productive cycles of both species. At the final stage of the experimental period, other sward components made an important contribution; DC (22%), Weeds (12%) and *Cynodon dactylon* (4%), and spontaneous *Holcus lanatus* (7%). The association between HM and SSH was medium to high, being the relationships; HM = - 4226 + 735 SSH - 17 SSH ^{2}, R^2 = 0.59 and HM = - 629 + 480 SSH - 20 SSH ^{2}, R^2 = 0.66 for before and after grazing respectively.

Details of vertical distribution of plant components and their proportions in the sward profiles, derived from point quadrat studies for the whole experimental period are presented in Figure 1. Independently of the treatment considered, most of the recorded hits were ryegrass leaves distributed in the whole sward profile, while triticale leaves (Tl) and stems (Ts) vs weeds and *Cynodon dactylon* were concentrated mainly above 20 cm height or below respectively (Figure 1). In general, the combination of treatments given by high SR, without supplementation and SGS reduced the relative contribution of Ts and Tl, having the opposite effect on ryegrass components (mainly leaves), demonstrating the greater adaptation of this species to intensive grazing conditions in comparison with triticale. Spontaneus *Holcus* made a significant contribution to sward on offer mainly at the end of the experiment associated with its late flowering period .

This experiment demonstrated the high forage productive potential, nutritive value and carrying capacity of ryegrass and triticale swards for lamb production in the sandy soils region of Uruguay, and the dominant effect of stocking rate on sward production, composition, nutritive value and structure compared with the other factors studied (grazing system and supplementation).

References

Montossi, F., San Julián R., Risso D.F., Berretta E.J., Ríos M., Frugoni J.C., Zamit W. and Levratto J.C. (1998). Alternativas tecnológicas para la intensificación de la producción de carne ovina en sistemas ganaderos del Basalto. II. Producción de corderos pesados. En: Seminario sobre actualización de tecnologías para el Basalto. Editor: Berretta, E.J. Serie Técnica N° 102. INIA Tacuarembó. Tacuarembó, Uruguay, pp. 243 - 256.

SAS. (1990). SAS User's Guide: Statistics, Versions 5 and 6 Edition. SAS Inc, Cary, North Carolina, USA.

Table 1 - The effects of Stocking Rate (SR; 25 and 35 lambs/ha), Grazing System ((GS; 7 days rotational (RGS) and strip (SG S)) and Supplementation ((S; with (W) or without (WH)) factors and their interactions on sward characteristics, before and after grazing.

	SR			GS			S			INTERACTIONS			
	25	35	P[1]	SGS	RGS	P	WH	W	P	SR*GS	SR*S	GS*S	SR*GS*S
Before Grazing													
HM	3211a	2832b	**	2996a	3047a	NS	2941a	3103a	NS	NS	NS	NS	NS
SSH	19a	17	**	19a	16b	**	17a	18a	NS	NS	NS	NS	NS
TGL	5a	5a	NS	5a	4a	NS	4a	6a	*	NS	NS	NS	NS
TGS	9a	6a	NS	8a	8a	NS	6b	9a	*	NS	*	NS	NS
RGL	36b	40a	*	38a	38a	NS	41a	36b	**	NS	NS	NS	NS
RGS	15a	15a	NS	15a	15a	NS	17a	14b	**	NS	NS	NS	NS
DC	21a	19a	NS	20a	20a	NS	18b	23a	**	NS	NS	NS	NS
CP	14a	14a	NS	14a	14a	NS	15a	13b	*	NS	NS	*	NS
NDF	59a	61a	NS	58b	62a	**	59a	61a	NS	NS	NS	NS	NS
ADF	33a	33a	NS	31b	35a	**	33a	33a	NS	NS	NS	NS	NS
After Grazing													
HM	2443a	1939b	**	2387a	1996b	**	2035b	2347a	**	NS	NS	NS	**
SSH	10a	8b	**	10a	9b	**	9a	10a	NS	NS	NS	NS	*
TGL	4a	4a	NS	4a	4a	NS	3a	4a	NS	NS	NS	NS	NS
TGS	8a	7a	NS	8a	6a	NS	5b	10a	**	NS	NS	NS	*
RGL	27a	24a	NS	26a	24a	NS	26a	24a	NS	NS	NS	*	NS
RGS	18a	20a	NS	19a	19a	NS	21a	17b	**	NS	NS	NS	**
DC	27a	30a	NS	28a	29a	NS	27a	30a	NS	NS	NS	NS	NS
CP	13a	13a	NS	13a	14a	NS	14a	13b	**	NS	NS	*	NS
NDF	63a	65a	NS	62b	67a	**	64a	65a	NS	NS	NS	NS	NS
ADF	35a	36a	NS	33b	37a	**	64a	65a	NS	NS	NS	NS	NS

[1] Significance = * P <0.05, ** P <0.01 and NS = Not Significant

Note: Herbage mass (HM; kg DM ha^{-1}), Sward surface height (SSH; cm), Ryegrass green leaf (RGL), Ryegrass green stem (RGS), Triticale green stem (TGS), Triticale green leaf (TGL), Dead component (DC), Crude protein (CP), Neutral detergent fibre (NDF) and Acid detergent fibre (ADF)

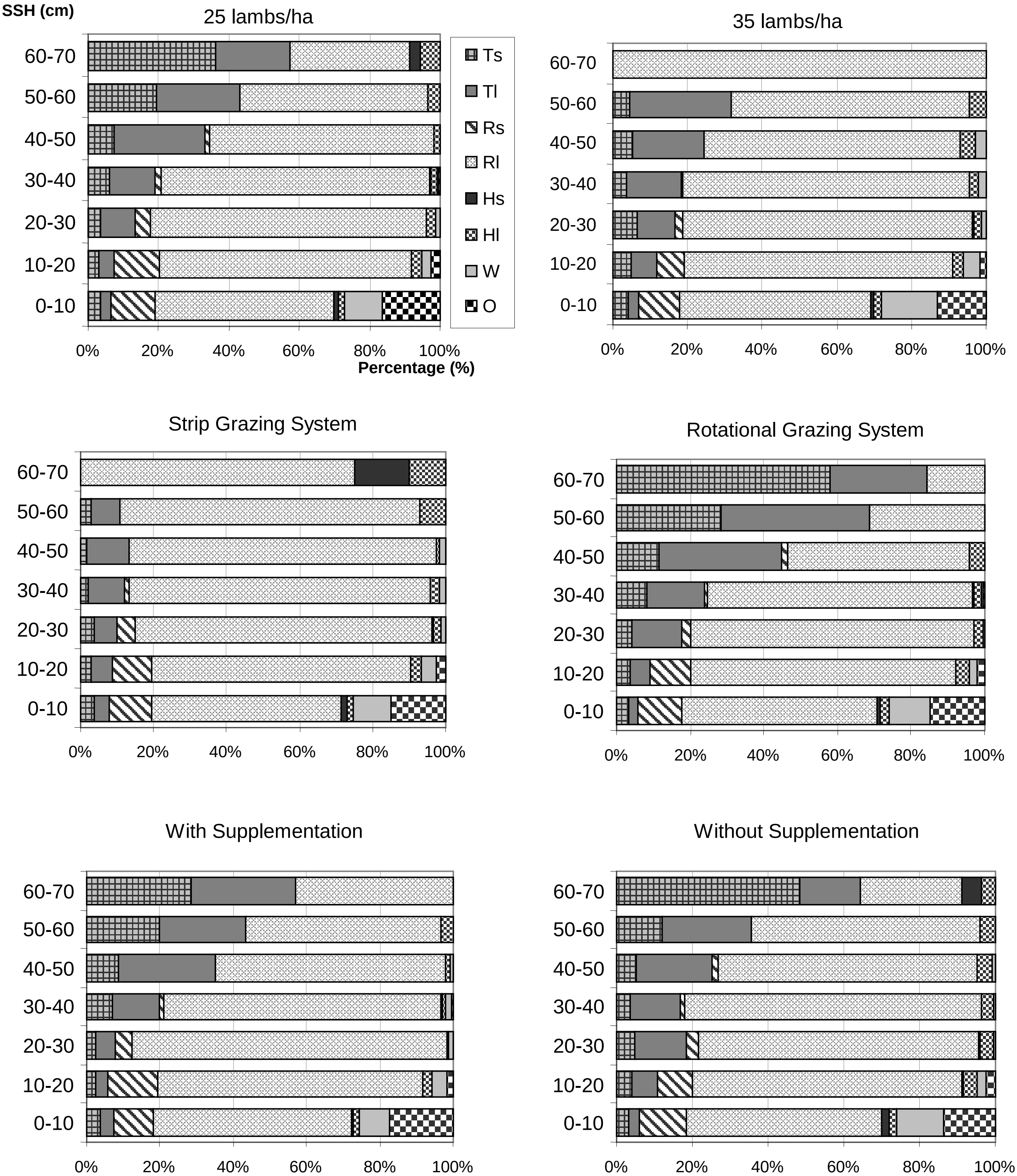

Figure 1 - The average effect of stocking rate, grazing system and supplementation on sward structure.

Note: Ts = Triticale stems; Tl = Triticale leaf, Rs = Ryegrass stems; Rl = Ryegrass leaf; Hs = *Holcus* stems; Hl = *Holcus* leaf; W = Weeds and O = *Cynodon dactylon.*