

THE INFLUENCE OF FEEDING REGIMES ON LAMB PERFORMANCE, CARCASS AND MEAT QUALITY TRAITS UNDER GRAZING CONDITIONS IN URUGUAY

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1 ABSTRACT

The inclusion of grain supplementation could improve individual lamb performance, production per unit of area, and carcass and meat quality. 75 Corriedale purebred or Merino Dohne crossbred lambs were assigned into 3 treatments (T) with different proportions of pasture (P) (mixture of *Plantago lanceolata* cv. Tonic and *Lotus corniculatus* cv. INIA Draco) and entire sorghum supplementation (C), where: T1, P (4% of live weight, LW); T2, P (2% LW) plus C (0.8% LW); and T3, P (2% LW) plus C (1.6 % LW). T1 lambs had significantly higher liveweight gain (LWG), hot carcass weight (HCW), boneless leg weight (BLW) than T2 and T3 lambs ($P < 0.05$). However, there were no effects of treatments on final liveweight (FLW), rib eye area (REA), fat cover (PC) at REA, carcass tissue depth at GR point (GR), frenched rack weight (FRW), meat colour (a^* and b^* , with the exception of L^* in favour of T1), tenderness, and pH. Restricted use of grain supplementation under grazing condition improved lamb performance and productivity per unit of area, but had minor influence on lamb carcass and meat quality.

3 METHODS

- **Animals:** 75 castrated Corriedale purebred or Merino Dohne crossbred lambs, 9-10 months of age and 35.5 ± 4.7 kg and 2.93 ± 0.35 units (scale 1-5) of initial fasted liveweight (FLW) and body condition (BC) respectively.
- **Treatments (T):**
 - T1, pasture 4% of liveweight (LW).
 - T2, pasture 2% LW plus concentrate 0.8% LW.
 - T3, pasture 2% LW plus concentrate 1.6 % LW.
- **Improved pastures** mainly dominated by a mixture of *Plantago lanceolata* cv. Tonic and *Lotus corniculatus* cv. INIA Draco.
- **Concentrated:** entire sorghum. The adjustment of assignment was done every 14 days.
- **Variables measured:** fasted LW gain (LWG), fasted final live weight (FLW), rib eye area (REA) and REA fat cover (PC) estimated by ultrasound scanning, hot carcass weight (HCW), cold carcass weight (CCW) and the weight of the most valuable meat cuts (Frenched rack and boneless leg), color (L^* , a^* , b^* using a colorimeter Minolta C10), tenderness (10 days of ageing, using a WBSF machine, SF), and ultimate pH (pH) at 48 hours pos mortem. Recorded from the approximate geometric center of the Longissimus dorsi muscle at the 12th rib, after 48 hours pos mortem. The information was analysed using the statistical package GLM procedure of SAS, with an analysis of variance in a model including treatment as main effects. Mean of the treatments were compared by test lsmeans test ($P < 0.05$). All data were initially tested for normality and homogeneity of variance and some variables were normalized previously to be analyzed. Also, some variables were adjusted by co-variates.

5 CONCLUSIONS

In the semi-extensive regions of Uruguay, the results of this study shows that the restricted use of grain supplementation in 8-12 months old lambs under grazing conditions, could improve animal performance and productivity per unit of area, but not necessary has major effects on lamb carcass and meat quality.

2 INTRODUCTION

The Uruguayan sheep production systems are mainly operated by small to medium scale livestock producers under extensive grazing, without the use of hormone promoters, feedlotting, or feeding ruminants with animal protein, etc. Meat and wool farming has principally moved to the marginal soils of the country [2]. Under this competitive commercial context, lamb production systems have to increase production levels and efficiency. Under grazing conditions, grain supplementation has demonstrated to be profitable when high stocking rates and restricted amount of supplements are used. Recently research studies have demonstrated additional benefits in carcass and meat quality, sensory attributes and consumer acceptance. This approach could be applied to the strategic use of grain supplementation for lamb fattening on improved pastures developed on medium and deep soils in the extensive Basaltic region of Uruguay, where most of the sheep farming is concentrated on. This experiment was designed to evaluate the effects of the restricted use of grain supplementation on specialized pastures for improving lamb production and carcass and meat quality.

4 RESULTS

Table 1. Mean values of animal performance characteristics and carcass quality traits.

Variable	Treatments			
	T1	T2	T3	P
Live weight gain (LWG) (g/d)	163 a	134 b	148 ab	**
Fasted live weight (FLW) (kg) ¹	53.0 a	49.8 b	51.5 ab	*
Rib eye area (REA) (cm ²) ²	11.5	11.3	11.3	ns
PC (mm) ²	4.1	4.0	4.2	ns
Hot carcass weight (HCW)(kg)	22.9 a	21.7 b	22.7 ab	**
GR (mm) ³	9.8	8.7	10.0	ns
Frenched Rack (kg) ³	0.514	0.497	0.502	ns
Boneless Leg (kg) ³	2.265 a	2.151 b	2.202	**

Note: a and b= means with different letters among columns are significantly different ($P < 0.05$). ns: not significant (*; $P > 0.05$, **; $P < 0.01$). 1: adjusted by initial FLW. 2: adjusted by FLW. 3: adjusted by HCW.

Table 2 - In vivo ultrasound measurements of heavy lambs

Variable	CF	Treatments			
		T1	T2	T3	P
SF (kgF) 10 days	-	2.5	2.6	2.6	ns
pH 24 hs	-	5.7	5.7	5.7	ns
L^* 10 days	$\sqrt{3}$	34.2	35.7	35.6	*
a^* 10 days	$\sqrt{3}$	17.2	17.4	17.2	ns
b^* 10 days	$\sqrt{3}$	7.6	6.9	7.3	ns

Note: ns: not significant ($P > 0.05$). a, b, c: means with different letters among columns are significant different ($P < 0.05$). CF = Correction factor.

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