

EFFECT OF DIFFERENT NUTRITIONAL STRATEGIES DIETS ON ANIMAL PERFORMANCE AND CARCASS TRAITS OF HEREFORD CULL COWS IN URUGUAY

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Abstract – The objective of this study was to evaluate the effect of different levels of forage allowance grazing on annual winter crop and rice bran (RB) supplementation on animal performance and carcass traits in Hereford cull cows. Forty Hereford cull cows (480 kg of live weight; LW) were randomly assigned to four treatments (T) as result of combining two levels of forage allowance (FA: 2 % and 4 % LW) and supplementation (S: 0.8% and 1.6 % LW of RB), where: T1=4% FA + 0% S; T2=2% FA + 0% S; T3=2% FA + 0.8% S; T4=2% FA + 1.6% S. At the beginning of the experiment, animals did not have significant differences (P>0.05) in LW. However, by the end of the experimental period, lower LW (P<0.05) was observed in T2 compared to the rest of the T. The same tendency was observed in the ultrasound measurements in particular the back fat thickness (P<0.05) and no difference was found in the rib eye area and marbling (P>0.05) traits. The nutritional strategy did not affect (P>0.05) hot and chilled carcass weights. Nevertheless, pistol cut (PC) and its boneless cuts (Striploin, Tenderloin, Rump) T4 were higher (P<0.05) for T1, T3 and than those for T2. A higher level of forage allowance or the addition of supplements under grazing conditions during the winter fattening period improved cull cows performance and quality carcass.

KEYWORDS: nutritional strategies, cow, animal performance, carcass traits.

I. INTRODUCTION

Various productive and economic factors exert strong pressure for more efficient livestock production systems in Uruguay, resulting in the intensification of productive systems. Several domestic studies have demonstrated that efficiency associated with better pasture management and supplementation significantly

increases productivity and farm profitability. In turn, cow slaughtering in Uruguay holds a very important position, being on average 45% (during the last 10 years) (1) of total slaughter. Several trials carried out by INIA proved that supplementation in cattle improve animal performances and carcass traits (2) (3). However, national research in fattening cull cows is scarce and more studies are need to evaluated ways to improve product quality in this important Uruguayan exporting category. The objective of this study was to evaluate the effects of different levels of forage allowance using an annual winter crop combined with rice bran supplementation on animal performance and carcass traits on cull cows in Uruguay.

II. MATERIALS AND METHODS

This experiment was carried out at “Glencoe Experimental Unit” – INIA Tacuarembó, situated in the Basaltic region of Uruguay. The experiment lasted 130 days. Forty Hereford cull cows, with an average initial live weight (LW) of 480.2 ± 10.1 kg grazing on annual winter crop made up of oat (Byzantine cv. Halley INIA) and spontaneous annual ryegrass, were allotted randomly to four treatments (T): T1 forage allowance of 4% (LW), T2 forage allowance 2% LW, T3 forage allowance 2% LW plus rice bran supplementation (RB) at 0.8% LW and T4 forage allowance 2% LW plus rice bran at 1.6% LW. The trial was conducted on two replicates, where each replicate was divided into four plots. The animals of the supplemented treatments had an intake adaptation period prior to the beginning of the experiment. The supplement was distributed once a day in the early hours of the morning.

During the whole experiment animals had free access to fresh water and mineral blocks.

The measurements taken on animals were weekly LW gain and fasted LW gain every 42 days. For T3 and T4, feed intake was adjusted every 14 days, according to the average LW of the animals of each plot. The variables measured *in vivo* were rib eye area (REA), back fat thickness (BFT) and marbling by ultrasound scanning at the beginning of the trial and every 28 days. The cull cows were slaughtered at a commercial packing plant. After slaughter, carcasses were graded (4) and hot carcass weight (HCW) was recorded. After 48 hours of chilling, carcasses were cut between 10 – 11th ribs and separated into primal cuts (PC). The pistol cut and its boneless cuts (Striploin, Tenderloin and Rump; R& L) were weighed. The statistical design was random plot model with two replicates for the treatments described above. The animal data was analyzed as repeated measurements, through the MIXED procedure of SAS and the results of carcass quality were analyzed by the GLM SAS procedure (5). LS means and differences among treatments were estimated ($P < 0.05$ or < 0.01).

III. RESULTS AND DISCUSSION

The effect of different feeding strategies on animal performance is shown in Table 1. At the beginning of the experiment, no significant differences were observed in live weight and fasted live weight. At the end of the study, cows from T2 had lower final LW and LW gain ($P < 0.05$) in comparison with T1, T3 and T4. From the measurements taken by ultrasound (REA, BFT and IMF), the only significant differences found in BFT ($P < 0.01$), having the same trend observed for LW. Different studies have proved that the use of supplementation in steers enhances the efficiency of feed utilization without compromising and even improving animal LW gain (6). Differences in LW gain and the effect of forage allowance resulted in different production per unit area during the study (450, 692, 691 and 744 kg LW/ha for T1, T2, T3 and T4, respectively). Luzardo *et al.* (2008) with similar experimental design, obtained alike findings.

The effect of different treatments on carcass traits is shown in Table 2. The different feeding strategies promoted differences in HCW, pistol cut and R&L ($P < 0.05$) weights, where, in general, T2 had lower values than T1, T3 and T4. However, when the variables were adjusted by final LW, these differences disappeared, showing the key effect of this variable. Studies carried out by del Campo *et al.* (2007) comparing grazing systems and grain supplementation levels did not detect differences ($P > 0.05$) in the weight for R&L.

Table 1. Results of animal performance traits for cull cows under the influence of different feeding strategies.

Variable	T1	T2	T3	T4	P
Initial LW (kg)	480.6	480.2	480.5	479.5	ns
Final LW (kg)	605.2a	539.3b	608.4a	620.8a	*
Initial fasted LW (kg)	451.8	451.4	451.7	450.7	ns
Final fasted LW (kg)	575.6a	519.4b	583.1a	598.4a	*
LW gain (kg/a/d)	0.95a	0.52b	1.01a	1.13a	**
Final REA (cm ²)	68.2	66.5	70.0	68.2	ns
Final BFT (mm)	9.99a	6.13b	10.29a	10.33a	**
Final IMF (%)	3.27	3.25	3.37	3.35	ns

Note: a, b = means with different letters among columns are significant different (* $P < 0.05$, ** $P < 0.01$). ns = not significant

Table 2. Results of carcass traits for cull cows under the influence of different feeding strategies.

Variable	T1	T2	T3	T4	P
HCW (kg)	292.0ab	266.2b	295.8a	309.3a	*
PC (kg)	68.7a	62.4b	68.4a	71.2a	*
R&L (kg)	13.9a	12.4b	13.9a	14.6a	*
Tenderloin (kg)	2.2	2.1	2.1	2.3	ns
Striploin (kg)	5.7a	4.9b	5.7a	6.1a	*
Rump (kg)	6.1a	5.4b	6.1a	6.3a	*

Note: a, b = means with different letters among columns are significant different (*: P<0.05). ns = not significant

IV. CONCLUSION

Animal performance and carcass quality traits in fattening cull cows systems can be improved by more efficient pasture management and/or the inclusion of supplementation under grazing conditions. Compared to grazing treatments (T1 and T2), increased forage allowances promote LW gains, resulting in higher carcass weight and value cuts weights. In addition, the implementation of supplementation with lower forage allowance (T3 and T4) enhances the productivity of the cull cows fattening system.

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