Food restriction in young calves and genital development[1]

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Abstract: With the objective of evaluating the effect of the rate of body weight (BW) gain, assay was performed with 45 calves in feedlot during the first winter and summer grazing, on the body and genital development at 18 months, randomly distributed in three treatments: feed *ad libitum*, 15% and 30% of quantitative restriction. They were fed a diet formulated to moderate gains, composed of expeller sunflower, corn grain, whole plant silage sorghum, mineral core and monensin, providing 3% of BW for the *ad libitum* treatment. The calves were weighed monthly and determined the rump height and thoracic perimeter. The results obtained for *ad libitum* treatment: rump height 116.6 and 131.3 cm; thoracic perimeter 153.3 and 158.6 cm; BW 290 and 301 kg; genital score 2.8 and 3.2, end of feedlot and summer grazing, respectively. The rearing during the first winter with BW gain between 0.75 and 0.60 kg day-1 (*ad libitum* and 15% restriction, respectively) similarly produces body and genital development of heifers retained as future bellies, reduce the costs of feeding the 15% restriction diet. The restriction of 30% (body weight gains of 0.37 kg day-1) affects the development of females, possibly compromising their future as breeders. It is estimated that the BW obtained for *ad libitum* and 15% restriction at the end of the grazing phase will achieve the minimum required for the first service in autumn, at 18 months old heifers.

Key words: growth, winter, genital score, heifers

Restrição alimentaria em bezerras e desenvolvimento genital[1]

Resumo: O objetivo do trabalho foi determinar o efeito de diferentes ganhos de PV de bezerras confinadas no primeiro inverno post-desmama, com recria estival pastoril, sobre o crescimento, desenvolvimento corporal e score genital (SG) em novilhas aos 18 meses de idade. Utilizaram-se 45 bezerras Brangus alojadas em 3 currais, com os tratamentos: à vontade (T1), 15% de restrição (T2), 30% de restrição (T3). A dieta, composta por expeller de girassol, milho em grão, silagem de planta inteira de sorgo e mistura mineral com ionóforo, foi formulada para ganho moderado, oferecendo 3% do PV em MS para o T1. As variáveis avaliadas foram altura à garupa, perímetro torácico, PV e SG. Para T1 os resultados obtidos foram altura à garupa 116,6 e 131,3 cm; perímetro torácico 153,3 y 158,6 cm; PV de 290 y 301,2 kg; SG de 2,80 y 3,23, para o fim do período de confinamento e fim do período em pastejo, respectivamente. Ganhos de PV entre 0,75 y 0,60 kg dia^{-1} (T1 e T2, respectivamente) durante o primeiro inverno da recria, produz similar desenvolvimento corporal e genital em novilhas retidas como futuros ventres, reduzindo o custo da alimentação na dieta com 15% de restrição. A restrição de 30% com ganho de 0.370 kg dia^{-1}, prejudica o desenvolvimento das fêmeas, possivelmente comprometendo seu futuro como reprodutoras. Estima-se que o PV obtido com T1 e T2 no final do período estival, permitirá atingir o PV mínimo requerido para a primeira monta no outono, aos 18 meses de idade das novilhas.

Palavras Chave: crescimento, inverno, novilhas, score genital

Introduction

One of the main limiting productive and economic of farming systems in the northeastern region of Argentina (NEA) is the age that heifers reach their 1 joining and reproductive response obtained due to lack of good body development and genital (Patterson et al., 2000).

The main forage resources in NEA farming systems are perennial summer pastures, characterized by accelerated spring-summer period allowing developing good growth rates; and winter to mature without growing pasture period, when zero profits (Holgado, 2008) or until BW losses due to imbalance between high protein and energy requirements of calves in growth, with low nutritional value of the observed field natural (Peruchena and Acosta, 2008), jeopardizing the next stage.

During rearing, the heifer must maintain a growth rate that attains puberty with proper body and reproductive development, which provides reproductive fitness (Patterson et al., 2000). This requires new alternatives for rearing replacement females.

The aim of this study was to determine the effect of different live weight gains in the first winter in corral feedlot, with spring-summer rearing in natural grassland on the growth and development of heifers at 18 months of age.

Material and Methods

The work was conducted in the southeastern province of Chaco, Argentina. The 45 Brangus calves born in October 2011, weaned in May 2012, were identified and implemented routine health plan during the period of adaptation to feedlot.

Calves entered the assay in June from eight months of age and 160 kg live weight. Randomly divided into three lots and housed in corrals feedlot, where treatments were applied: T1 - fed *ad libitum*, T2 - fed 15% restriction of *ad libitum*, T3 - fed 30% restriction of *ad libitum.*

Diet, consisting of expeller of sunflower, corn grain, whole plant silage sorghum and mineral core with ionophore, was formulated for moderate gains in accordance with the recommendations of the NRC, providing 3% of BW for T1.

At the end of the period of feedlot, 13/12/12, heifers were moved all together in a pasture with natural pasture quality and availability, ending the trial the 04/08/13.

Evaluated parameters were height at the rump (RH), thoracic perimeter (PT), BW and genital score (SG), determined at the beginning and end of the period of feedlot, and the end of the grazing period. The SG was determined by transrectal ultrasonography, using the 1-5 scale where SG 3 is considered a female who started their reproductive activity, and SG 4 is a mature genital (Anderson et al., 1991).

Design was completely randomized, with three treatments. It was considered the animal as experimental unit. Data were analyzed by analysis of variance (ANOVA) and post-test comparison of means by Tukey ($\alpha = 0.05$) for all variables. Analyses were performed with Infostat (2007) statistical software.

Results and Discussion

In the feedlot stage of growth and animal performance she was in line with expectations, showing initial BW loss in animals with greater restraint. At the end of this period heifers fed *ad libitum* they presented height at the rump, BW and score genital similar receiving the 15% restriction, presenting in thoracic perimeter in both treatments higher values than that 30% restriction (Table 1 and 2).

In the grazing stage, heifers fed *ad libitum* and with 15% restriction, they lost 20 and 12 kg BW, respectively, in the first month. Then they resumed their growth reaching body weight, rump height, thoracic perimeter, body weight and genital score similar (Table 1 and 2).

Table 1. Means and standard deviation of thoracic perimeter (PT) and rump height (RH) (cm^{-1}) to initial and final of feedlot and final period of grazing

Treatment	Initial feed lot 28/6/12		Final feed lot 13/12/12		Final grazing 08/04/2013	
	PT (cm^{-1})	RH (cm^{-1})	PT (cm^{-1})	RH (cm^{-1})	PT (cm^{-1})	RH (cm^{-1})
Ad Libitum	130.3 ± 5.2a	106.8 ± 3,1ab	153.3 ± 6.5c	116.6 ± 3.2b	158.6 ± 5.9b	131.3 ± 16.4b
Restriction 15%	129.2 ± 6.7a	107.9 ± 2,9b	147.3 ± 8.5b	116.6 ± 2.9b	159.0 ± 7.5b	125.4 ± 2.6ab
Restriction 30%	127.7 ± 7.5a	105.3 ± 2,6a	137.4 ± 7.9a	113.3 ± 3.4a	149.9 ± 5.6a	120.4 ± 3.0a

The animals restricted to 30% during corral confinement, showed no loss of body weight in the grazing stage, but at the end of this stage were statistically lower than those fed *ad libitum*, regarding rump height, thoracic perimeter and body weight.

Table 2. Means and standard deviation body weight (BW) to initial and final of feedlot and final period of grazing and genital score (GS)

Treatment	Initial feed lot 28/6/12		Final feed lot 13/12/12		Final grazing 08/04/2013	
	BW (kg)	GS	BW (kg)	GS	BW (kg)	GS
Ad Libitum	161.2 ± 19.0 a	-	265.5 ± 33.9 b	2.80 ± 0.9 b	301.8 ± 32.1 b	3.23± 0.7 a
Restriction 15%	163.3 ± 16.8 a	-	245.9 ± 27.3 b	2.73 ± 1.0 b	301.0 ± 26.5 b	3.00 ± 0.9 a
Restriction 30%	154.7 ± 17.0 a	-	196.4 ± 27.3 a	1.79 ± 0.7 a	264.6 ± 24.0 a	2.60 ± 0.9 a

The genital score of heifers, at the end grazing stage, showed no significant difference between treatments, due to the high variability of the results.

Calves in winter with restriction of 30% of the fed *ad libitum*, showed the highest growth rate during the rearing in grazing stage. This compensatory growth grazing, but it was insufficient to meet the body development and body weight observed in heifers without restriction.

Body weight and body and genital development achieved at 18 months, we infer that the heifers will be able for the first service in autumn.

Conclusions

Restriction of 15% of the diet during the first winter in feedlot, did not affect the growth or development of replacement heifers.

The restriction of 30% of the diet during the first winter in feedlot affected the growth and development of replacement heifers, despite the compensatory growth observed in the grazing stage.

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