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PERFORMANCE OF NELLORE CATTLE UNDER TWO GRAZING MANAGEMENT SYSTEMS

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Abstract

The objective of this study was to evaluate the effects of grazing intensification on birth weight (BW), weaning weight (WW, standartized to 205 days), average daily gain from birth to weaning (ADG), and gestation length (GL) of calves, cow weight at calving (CWC) and at weaning (CWW), cow condition score at calving (CCC) and at weaning (CCW), and BW/CWC (BWR), WW/CWC (WWRC) and WW/CWW (WWRW) ratios. One hundred and sixty eight Nellore calves born in 1998 and 1999, out of dams maintained in two grazing management systems were evaluated: an extensive 1.0 animal unity (AU). ha^{-1} system on unfertilized *Brachiaria decumbens* pasture (SR); and an intensive rotational 5.0 AU. ha^{-1} system on fertilized *Brachiaria brizantha* cv. Marandu and cow-calf feed supplementation during dry season (SI). Analyses of variance showed a significant ($P<.01$) system effect on CWW and CCW, independently of year of birth of calf, a significant ($P<.05$ and $P<.01$) year of birth x system interaction effect on WW, ADG, BWR, WWRC and WWRW, and no effect at all on BW, CWC, CCC and GL. Results suggest that benefits of intensification were through improving production per hectare and not per animal.

Keywords: beef cattle, body weight, grazing intensity, production system, rotational grazing.

Introduction

Beef production in Brazil has been attained mainly in extensive systems on pasture, where animals are exposed to a seasonal shortage of forage and little health control. Intensive beef production can contribute significantly to Brazilian beef industry, since it favors rational utilization of the production factors and the potential and genetic diversity of plants and animals. However, it is necessary to generate and to adapt suitable technologies, capable of improving the production level in a sustainable manner. The objective of this study was to evaluate performance of Nellore cattle under grazing intensification.

Material and Methods

Data used in this study were from Nellore cattle raised on pasture at the Embrapa - Southeast Cattle Research Center, in São Carlos, São Paulo, Brazil. Two production systems, each one with 60 Nellore cows, were carried out for three years (1997 to 1999). In one system (SR), cows stayed all year-round in a 60-ha unfertilized *Brachiaria decumbens* pasture, divided into three 20-ha paddocks, receiving free choice mineral mixture but no feed supplementation. In the other system (SI), cows were maintained in a 12-ha *B. brizantha* cv. Marandu pasture, divided into thirteen .92-ha paddocks. In this latter system, each paddock was grazed for three days and then rested for 36 days. Each paddock was fertilized with 250 kg. ha^{-1} of the NPK formula 20:05:20, applied four times immediately after each grazing period, during the rainy season. In the winter (dry season), usually from June throughout November, SI cows received feed supplementation, composed of: 1997 – sugar cane, poultry litter silage and urea; 1998 – sugar cane, poultry litter silage, urea, dried citrus pulp and

soybean meal; and 1999 – sugar cane, ground corn, urea and soybean meal. Calves of this latter system were creep-fed from 53 to 209 days of age, in 1998 and from 20 to 196 days of age, in 1999. Breeding season started in late May and lasted for 100 days, in 1997 and 1998. Calves of each system were sired by two different bulls each year.

Traits studied were birth weight (BW), weaning weight (WW, standartized to 205 days), average daily gain from birth to weaning (ADG), and gestation length (GL) of calves, cow weight at calving (CWC) and at weaning (CWW), cow condition score (3 = very thin through 8 = extremely fat) at calving (CCC) and at weaning (CCW), and BW/CWC (BWR), WW/CWC (WWRC) and WW/CWW (WWRW) ratios. Analyses of variance were carried out by the least squares method, with a mathematical model which included effects of year (YB; 1998 and 1999) and month of birth (MB; March, April, May and June) of calf, sex of calf (SC), age of cow at calving (AC; 4 through 9 years old), system (SR and SI), and the interactions YB x MB and YB x system, using GLM procedure (SAS, 1996).

Results and Discussion

Analyses of variance showed that YB and YB x MB had no effect ($P>0.05$) on traits studied. Month of birth affected ($P<0.05$) WW, ADG and WWRW. Sex of calf affected ($P<0.01$) BW, WW, ADG, BWR, WWRC and WWRW, and male calves were usually heavier and gained more weight than the females. Age of cow affected ($P<0.05$ and $P<0.01$) only CWC, CWW, BWR, WWRW and GL.

The YB x system interaction affected WW, ADG and WWRC ($P<.01$) and BWR and WWRW ($P<.05$), while system affected ($P<0.01$) CWW and CCW independently of year of calving. System and YB x system had no effect ($P>.05$) on BW, CWC, CCC and GL.

The least squares means of the traits studied are presented in Table 1. At calving (end of the rainy season), in both years, cow weight (CWC) and condition score (CCC) were

similar for both systems. During the rainy season, total dry matter (TDM) availability was 4,500 kg for system SR, while for system SI there was accumulation of 2,500 to 3,500 kg of green blade dry matter (GBDM) every 36 days. During this season, stocking rate was kept at 1.0 AU. ha^{-1} for system SR and varied from 5,0 to 8,0 AU. ha^{-1} for system SI. The similar performance of the cows in the two systems may be due to the low stocking rate in system SR, allowing selective grazing and consumption of good quality forage (8 to 9% crude protein), above the critical level (6 to 7%) reported by Minson and Milford (1967). However, at weaning (very end of the dry season and very beginning of the rainy season), in both years, cow weight (CWW) and condition score (CCW) were higher for system SI, in which paddocks were fertilized in summer and animals received feed supplementation in winter. During the dry season, DM availability was 2,500 kg for system SR, while for system SI there was accumulation of 500 kg of GBDM every 48 days. When the changes in weight and in condition score from calving to weaning were analyzed, it was shown that SR cows lost more weight (83 ± 4 kg vs. 31 ± 4 kg) and condition (1.5 ± 0.1 points vs. 0.5 ± 0.1 points) than SI cows. As the nursing period occurs during the dry season, it is normal that animals loose weight and condition, specially if they do not receive supplementation.

The WW, ADG, BWR and WWRC were similar for both systems in 1998, but in 1999 SI calves weighed and gained more, probably due to the longer creep-feeding period (Table 1). For WWRW, however, SR calves performed better than SI calves, in 1998, because of the much heavier cows in system SI and slightly heavier calves in system SR, while in 1999 the heavier SI calves compensated for the heavier SI cows.

It can be concluded that, for the traits studied and for the condition of this work, the benefits of intensification were obtained through improving production per hectare and not per animal.

References

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Table 1 - Least squares means (± standard error) for birth weight (BW, kg), weaning weight (WW, kg), average daily gain from birth to weaning (ADG, kg/day), cow weight at calving (CWC, kg) and at weaning (CWW, kg), cow condition score at calving (CCC) and at weaning (CCW), BW/CWC (BWR, g/kg), WW/CWC (WWRC, g/kg), WW/CWW (WWRW, g/kg) and gestation length (GL, days), according to year of birth of calf and grazing management system.

	Year/System[a]					
	1998		1999		1998 and 1999	
Trait	SR	SI	SR	SI	SR	SI
BW	29.8 ± .9	30.0 ± .9	30.0 ± .6	31.6 ± .5	29.9 ± .5	30.8 ± .5
WW[1,2]	173.2 ± 4.8	169.1 ± 5.0	162.2 ± 3.2	183.0 ± 3.1	167.7 ± 2.9	176.1 ± 2.9
ADG[1,2]	.70 ± .02	.68 ± .02	.64 ± .01	.74 ± .01	.67 ± .01	.71 ± .01
CWC	467 ± 10	482 ± 11	475 ± 7	472 ± 7	471 ± 6	477 ± 6
CWW[2]	389 ± 10	440 ± 11	382 ± 7	453 ± 7	385 ± 6	447 ± 6
CCC	5.42 ± .16	5.52 ± .17	5.28 ± .11	5.18 ± .10	5.35 ± .09	5.35 ± .10
CCW[2]	3.76 ± .19	4.59 ± .19	3.98 ± .12	5.07 ± .12	3.87 ± .11	4.83 ± .11
BWR[1]	64 ± 2	62 ± 2	63 ± 1	67 ± 1	63 ± 1	65 ± 1
WWRC[1]	370 ± 11	353 ± 11	345 ± 7	389 ± 7	358 ± 7	371 ± 7
WWRW[1,2]	452 ± 14	391 ± 15	429 ± 10	408 ± 9	441 ± 9	400 ± 9
GL	297 ± 3	293 ± 3	290 ± 2	292 ± 2	294 ± 2	293 ± 2

[a] SR and SI = extensive and intensive systems, respectively.
[1] significant year of birth of calf x system interaction. [2] significant system effect.