ECONOMICAL EFFICIENCY OF SUPPLEMENTED AND NON-SUPPLEMENTED ON PASTURE BOVINE PRODUCING SYSTEMS

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Background

Brazil has the largest commercial bovine livestock of the world, around 164 million animals in 2001 (ANUALPEC, 2002). Most Brazilian beef cattle is produced under extensive systems (LANNA, 1997). The need for productivity leads producers to search for alternatives to increase meat production with the lowest possible cost. Among these alternatives, emphasis should be given to the nutritional supplementation of animals on pasture and to the crossbreeding *Bos indicus* x *Bos taurus*. This joins rustic features and good adaptation of the former (basis of national cattle breeding) to the good muscle development ability of the latter (BLISKA & GONÇALVES, 1998). In financial efficiency evaluation of breeding systems, producers frequently use animal live weight gain and live weight at slaughter as the main parameters. Nevertheless, bovine prices are generally defined on the basis of carcass weight instead of live weight. For this reason, performance evaluation of bovine production systems must be done on the basis of the effective carcass gain.

Objectives

The aim of this work was to generate information to orientate a most accurate evaluation of the economical efficiency of bovine production systems.

Methods

In this experiment, 40 steers - 20 *Bos indicus* (Nelore) and 20 *Bos taurus* x *Bos indicus* (Nelore x Limousin) - were utilized. At the beginning of the experiment, 10 animals from each genetic group with around 330-350 kg mean weight and 22 months old were slaughtered, according to official procedures (BRASIL, 1997). From the remaining animals, 10 (five from each genetic group) were bred exclusively on pasture during 314 days while 10 others were bred on pasture under supplementation feeding system (Navimix nutritional supplement – 1% live weight, daily), during 205 days. After these breeding periods, all animals were slaughtered. Live weight, hot carcass weight, carcass yield (dressing percentage), carcass length, rib eye area (*Longissimus dorsi* muscle area at 12th rib), fat thickness, cooling loss, meat and fat trimming and other productive parameters were determined at slaughtering time. Based on mean carcass yield of the animals slaughtered at the beginning of the experiment, the animals carcass gain was estimated and the economical efficiency of each genetic group at both breeding systems was determined.

Results and Discussion

Animals from both genetic groups were slaughtered with similar ages (**Table 1**). All animals slaughtered in this experiment, aging less than 36 months old, are considered "young animals" according to Brazilian Carcass Grade System (BRASIL, 1989). No difference for live weight among animals of the same genetic group was found at the beginning of the experiment, while crossbred animals were significantly heavier than the Nelore ones. The crossbred animals had the higher carcass weight, although the breeding system showed no influence on this parameter. Within each genetic group, dressing percentage of the animals slaughtered at the beginning of the experiment was significantly lower than that of finished animals. The dressing percentage values observed at the beginning of the experiment were used to estimate carcass initial weight (**Table 2**) in order to evaluate comparatively the economical performance of both production systems. Although nutritional supplementation led to an increase in daily live weight gain, for both racial groups, it led to a decrease in the economic efficiency of the production system. Comparing carcass weight gain and costs between the two nutritional systems, it was demonstrated a superior economical return from the animals maintained exclusively under pasture system. This result was probably caused by weather, since no dry period occurred during the experiment. The cross-bred animals that remained exclusively on pasture, enough to their nutritional requirements, showed higher carcass gain yield: 62.55% of the live weight gain increase corresponded to the carcass gain, what was effective for the economic efficiency result found. Results suggest that the use of supplementation with good quality pasture led animals to ingest supplement, instead of pasture, endangering the economic efficiency of the supplementation practice. In Brazil, there still are regions in which pasture cost is low. The extensions and pasture quality of these regions are adequate to supply even the high crossbred nutritional needs. These data indicate the need for more information in order to orientate producers in the analysis of the economic efficiency of the production systems.

Conclusions

- With good quality and low cost pasture, the nutritional supplementation economical benefits should be well evaluated, even for high nutritional needs animals.
- As beef producers payment in Brazil is based on carcass weight, the evaluation of the economic efficiency of production systems, based on live weight data, may lead to mistaken options.
- Data about effective carcass weight gain are necessary for productive performance studies.

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Table 1. Productive parameters of the genetic groups at both production systems

	Beginning of the experiment (0 days)		Supplemented (205 dias)		Extensive system (314 days)	
	Nelore	L x N	Nelore	L x N	Nelore	L x N
	Mean ± SD	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**
Age at slaughter (m)	22.30 c	21.90 c	29.00 b	29.00 b	32.20 a	31.00 a
	1.25	1.45	0.00	0.00	0.45	1.58
Initial live weight (kg)	328.50 b	347.70 a	321.60 b	346.00 a	320.40 b	338.00 ab
	15.06	14.98	8.05	20.20	9.32	11.05
Live weight at slaughter (kg)	333.00 e	354.20 d	476.00 b	509.20 a	450.60 c	493.00 ab
	14.35	18.79	21.21	12.54	17.37	21.75
Carcass weight (kg)	170.58 d	185.48 c	252.60 b	278.12 a	241.76 b	273.80 a
	9.41	10.49	9.49	9.65	10.74	8.62
Dressing percentage (%)	51.21 d	52.33 cd	53.08 bc	54.61 ab	53.68 bc	55.52 a
	2.00	1.33	1.19	0.76	1.11	0.88

Table 2. Productive and economical efficiency evaluation for both production systems

	Supplemented 205 days		Extensive system 314 days	
	Nelore	Crossbreed	Nelore	Crossbreed
Daily live weight gain (kg)	0.753	0.796	0.415	0.494
Initial carcass weight (estimated) [1]	164.72	181.10	164.11	176.91
Total carcass gain (kg)	87.88	97.02	77.65	96.89
Daily carcass gain (kg)	0.429	0.473	0.247	0.309
Carcass gain yield (%) [2]	56.97	59.42	59.52	62.55
Financial gain (US$)[3]	105.46	116.42	93.18	116.27
Supplement cost./ animal (US$)[4]	55.35	55.35	-	-
Difference pasture cost / animal (US$)[5]	-	-	13.08	13.08
Profit (Gain Cost) / animal (US$)	50.11	61.07	80.10	103.19

[1] estimated initial carcass weight, based on the dressing percentage of the animals slaughtered at the beginning of the experiment;
[2] (carcass weight daily gain / live weight daily gain) x 100;
[3] 15 kg of carcass = 1 arroba = R$ 54,00 = US$ 18.00 (US$ 1.00 = R$ 3,00). So, 1 kg of carcass = US$ 1.20;
[4] 3 kg supplement (1% live weight) / day / animal. Price of supplement = US$ 0,09 / kg;
[5] Difference between systems = 109 days. Pasture estimated renting cost = US$ 3.60 (20% arroba carcass price or 3 kg carcass price) / month / animal.

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