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Alternative for intensification of beef production under grazing

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Introduction

One of the challenges to overcome in order to assure the position occupied by Brazil as one of the most important players in the world beef market is to design sustainable technological alternatives, which will maintain a constant uniform beef supply all year round. This crucial problem could be solved by using more intensively, the alternatives available for pastures management and feed supplementation. However, the potential results created by these strategies might be better explored by using the right choice of animals as far as genetic group and weaning weight is concerned. Thus, in order to fulfill this goal it was designed an experiment was designed to evaluate combinations of pastures species (*Brachiaria* and *Panicum*), pasture management (feed supplementation and rotational grazing) and animal genetic groups.

Methods

This grazing trial was carried out on an Oxisol at Embrapa Beef Cattle, Campo Grande, MS, Brazil, from May 2006 to October 2007. Sixteen weaned calves of the following genetic groups F1 Nellore-Angus (AN), ½ Braford - ¼ Angus - ¼ Nellore (BfAN), ½ Brahman- ¼ Angus - ¼ Nellore (BhAN), and 5/8 Charolais- 3/8 Nellore (Canchim) were evaluated.

The pastures utilized during the both dry periods were eight *Brachiaria brizantha* cv. Marandu (palisade grass) paddocks (3 ha each). These paddocks received 50 kg/ha of N in February, and they were subjected to continuous stocking during the dry periods. During the first dry period (FDP, May 2006 to September 2006), 64 weaned calves, at approximately 8 months of age with an average initial weight of 220 kg, were randomly distributed in eight paddocks of palisade grass, according to genetic group and weight. During this period all animals had their diet supplemented. Two supplements were evaluated: a concentrate (CS) with 43% corn, 40% soybean, 11% urea, 4% mineral mixture and 3% calcium carbonate and multiple mineral mixture (MM) with 33% corn, 35% soybean hulls, 12% urea, 15% NaCl, and 5% of other essential minerals. These supplements were provided in quantities representing 0.8% and 0.2% of the liveweight, respectively, for 142 days. During the subsequent rainy period, (RP, October 2006 to April 2007) all animals were

Table 1. Means for herbage mass, percentages of lamina leaves, crude protein (CP) and *in vitro* organic matter digestibility (IVOMD) for the *Brachiaria brizantha* pastures utilised during FDP and SDP, and for *Panicum maximum* utilised during RP.

	<i>Brachiaria brizantha</i> FDP	<i>Panicum maximum</i> RP	<i>Brachiaria brizantha</i> SDP
Herbage Mass (t/ha)	3.8	4.6	3.0
Lamina leaf (%)	23.6	70.4	17.9
CP (%)	7.2	14.5	6.1
DIVMO (%)	49.4	66.2	46.1

randomly transferred to *Panicum maximum* cv Tanzânia pastures, subjected to rotational grazing. This pasture (13.5 ha), was divided in 12 modules of six paddocks. The grazing process was monitored carefully to ensure that sward targets for post-grazing heights of 40 cm and pre-grazing height of 90 cm, corresponding to 95% light interception by the canopy (Barbosa *et al.*, 2007 and Difante *et al.*, 2010). The maintenance fertilisations were 80 kg/ha of P₂O₅, 80 kg/ha of K₂O and 200 kg/ha of N. During the next dry period (SDP, May 2007 to September 2007), all animals were randomly distributed in the same paddocks used in the previous dry season. The pasture management was the same as described above. All steers had their diet supplemented with CS at 8% of LW. The animals were weighed each 28 days and checked with respect to the end point (minimal 3mm of fat cover). Animals considered finished were slaughtered. Forage samples were taken at 28-day intervals. The data were grouped according to periods (FDP, RP and SDP). The data were subjected to an analysis of variance using the Mixed Procedure in SAS. The applied model included the random effect of the blocks, the fixed effects of the supplement and genetic group and the interactions between them. The means were compared with a Tukey test at a 5% significance level.

Results and Discussion

The herbage mass of the deferred *B. brizantha* pastures was sufficient to maintain the animals during both dry periods. However, the percentage of leaf, crude protein and *in vitro* organic matter digestibility were low (Table 1) confirming

Table 2. Means for average daily gain (ADG; kg/animal.day) for the first and second dry periods and for the rainy period, Liveweight (LW) at slaughter and slaughter age, according to genetic groups. Means followed by the same letter in the same row do not differ ($P>0.05$).

	AN	Canchim	BfAN	BhAN	Standard error	Treatment effect
ADG (first dry period)	0.653 a	0.613 a	0.503 b	0.517 b	0.031	0.0001
GMD (Rainy period)	0.734 a	0.627 b	0.688 ab	0.674 ab	0.036	0.0470
ADG (second dry period)	0.623 a	0.486 b	0.574 a	0.545 ab	0.063	0.0277
LW at slaughter (kg)	475	495	493	490	10	0.0002
Slaughter age (month)	19.2 c	23.3 a	22.2 b	22.7 ab	0.4	0.0001

that nutritive value of deferred pasture is a limiting factor to animal production (Euclides *et al.* 2007). This suggests the importance of animal supplementation during this period. The correct management of *P. maximum* pastures, on the other side, resulted in greater herbage mass of high quality (Table 1).

No genetic group by feed supplement interaction ($P>0.05$) was detected for any variable studied. However, independently of genetic group animals receiving CS feed supplementation gained more ($P=0.0001$) weight than those receiving MM diet supplementation (750 and 400 g/day, respectively) and were slaughtered at a younger age than those receiving MM during the dry period, in spite of gaining a little less during the rainy season. During the subsequent rainy season, animals receiving MM (720 g/day) during the dry season gained more ($P=0.0048$) weight than those receiving CS (650 g/day). However, this superiority was not enough to eliminate the difference in live weight observed at the end of the rainy season, when the animals supplemented with CS were heavier ($P=0.0001$, 447 vs. 413 kg). On the other hand, during the second dry period there was no observed ($P=0.5633$) difference in average daily gain. Slaughter age was affected ($P=0.0001$) by the supplementation during the first dry period and the average ages were 23 vs. 21 months.

As far as genetic group is concerned, AN gained more

weight and reached the end point at a younger age than all other groups. This result might be a consequence of two combined effects, heterosis and breed effect, since Angus is an early fattening breed. The early maturing breed effect may also be observed in differences in age at slaughter, which favour animals with greater percentage of British breeds (Angus and Braford).

Conclusion

Use of genetic groups, which are early maturing, is crucial in capitalizing the diet improvement provided by supplementation and integrated pasture management systems. The amount of concentrate used as diet supplementation just after weaning is an alternative to intensification of beef production.

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