USE OF SUPPLEMENTAL CONCENTRATES IN PASTURE FEEDING SYSTEMS FOR BEEF PRODUCTION

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ABSTRACT
An experiment was conducted on *Brachiaria decumbens* pastures with sixty, 7-month old, weaned F1 Angus-Nellore calves distributed in the following treatments: A) no supplementation; B) supplementation during the second dry season of life; C) supplementation during the first dry season after the weaning; D) supplementation during both dry seasons; and E) supplementation during the first dry season and feedlot in the second one. The experimental period was from weaning to slaughter. The average daily gain during the experimental period (ADGE) varied among treatments. The linear functions, representing the orthogonal contrasts tested, allowed the conclusion that the mean ADGE for the treatments in which the animals received any supplementation was greater than the ADGE obtained by the animals without supplementation (510 vs 375 g/day). Similar conclusions can be drawn for age at slaughter (AS). The animals in treatment B, C, D and E were ready for slaughter at 24 months of age while those in treatment A were ready only at the age of 28.4 months.

KEYWORDS
Angus-Nellore, grazing management, savanna, stocking rate, tropical grass

INTRODUCTION
Beef cattle production in Brazil has been challenged to provide production systems in which beef is produced efficiently, with good meat quality and low price. Besides that, these production systems must be competitive, sustainable, and have to offer animals for slaughter before they are 42 months of age, which is the Brazilian national average.

The objectives of this work were to evaluate systems seeking to reduce the slaughter age and to determine in which phase of the animalís life would the feed supplementation be more attractive, as far as biological performance and management aspects are concerned.

MATERIAL AND METHODS
The experiment was conducted at EMBRAPA-CNPGC (National Beef Cattle Research Center), Campo Grande, MS, Brazil from June 1994 to July 1996, on *Brachiaria decumbens* cv. Basilisk pastures. Average annual rainfall is about 1500mm, of which 80% falls during a 7-month wet season. The experimental area (28 ha), was divided into 15 paddocks. Sixty weaned F1 Angus-Nellore calves (averaging 195 kg of initial weight and 7 months old) were randomly assigned to each paddock, in the following treatments: A) no supplementation; B) supplementation during the second dry season of the animalís life; C) supplementation during the first dry season after the weaning; D) supplementation during both dry seasons; and E) supplementation during the first dry season and feedlot in the second one. The experimental period was from weaning to slaughter.

The supplement utilized in the first dry season was a commercial ration (20.3% CP; 68% TDN; 2.53% Na; 1.17% Ca; 0.7% P), supplied daily at about 0.8% of liveweight (LW), for a period of 102 days.

During the second dry season the supplement changed (18% CP; 75% TDN; 2.53% Na; 1.17% Ca; 0.7% P), and so did the daily ration about 1% of LW, for a period of 111 days.

The feedlot treatment lasted 100 days, and the steers received *ad libitum*, a diet containing 40% of *B. decumbens* hay (40% TDN, 3.8% CP and 30g/steer of urea-sulphur mixture) and 60% of concentrate (75% corn grain, 22% soybean meal, 1% Na bicarbonate, 1.5% Ca carbonate and 0.5% mineral mixture).

Forage samples were taken and liveweight gain was measured at 28-day intervals.

The final experimental design had five treatments with three replications(paddocks) and twelve animals/treatment. The data were analyzed using a mathematical model containing the fixed effects of treatment (TR) and paddock (PD) within treatment PD(TR). The weight at the beginning of the experimental period was included in the model as a covariable.

RESULTS AND DISCUSSION
Throughout the experiment both groups of pastures, supplemented or not, presented similar ($P > 0.05$) availabilities of forage dry matter, and forage green dry matter (GDM), averaging 2500 and 750 kg/ha, respectively. It was observed that despite the superior GDM availability ($P < 0.01$) during the wet season than in the dry (950 and 500 kg/ha, respectively), the total amount of herbage available was similar ($P > 0.05$) in both, averaging 2500 kg DM/ha.

However, the pastures in which the animals received supplementation, were able to sustain higher ($P < 0.01$) stocking rate than those without supplementation, averaging 1.07 and 0.80 AU/ha, respectively. The average consumption of concentrate that allowed this difference was approximately, 1.89 in the first year, and 3.30 kg/steer/day in the second year (equivalent to 0.82 e 0.92% of the LW).

The average daily gains observed in the whole experimental period are presented in Table 1, while those obtained according to treatments and experimental year are in Table 2. The average daily gain during the experimental period (ADGE) was dependent on treatment ($P<0.01$). The linear functions, representing the orthogonal contrasts tested, allowed the conclusion that the mean ADGE for the treatments in which the animals received supplementation was greater than those obtained by the animals without supplementation (510 vs 375 g/day). Similar conclusion can be drawn for age at slaughter (AS). The animals in treatment B, C, D and E were ready for slaughter at 24 months of age while those in treatment A were slaughtered at the age of 28.4 months.

It was used contrasts to make the following comparisons: treatment B against C, treatment D against E and treatment B against D. It was concluded that for both, ADGE and AS, there were differences between treatments D and E ($P<0.01$) and between treatments B and D ($P<0.05$).

Considering these results and the fact that the cost of supplementation of an animal just after weaning, i.e. during the first dry season are lower than it is for older animals, it appears that it should be more economical to use treatment C instead of B. However, in view of this, it is important to evaluate this situation under grazing conditions.

Animals in treatment C will stay, on the average, for one month longer in the pasture than will those from treatment B. Considering that this will occur during the middle of the rainy season, one must take into account that using supplementation during the second dry season would allow more forage to be available for other animal categories which must continue grazing.

Another point that creates some controversy is related to compensatory gain. As indicated by Sanbidet and Verde (1973), an alternative for producing economic weight gains in beef cattle, is to manage them in order to capitalize on compensatory gain. In this experiment there was an important effect of the compensatory gain ($P<0.05$) during the second rainy season, but not during the first one. This was a consequence of weight loss which occurred during the second dry season, which was not observed in the first one.

As far as biological performance and management is concerned, it can be concluded that treatment E reduced by three months the AS compared to treatment D. On the other hand, this treatment reduced three months in AS compared to C, and two months compared to B. Besides the supplemented pastures being able to sustain higher stocking rates, the supplementation also allowed slaughtering in the middle of the rainy season when forage is normally in abundance that can be used for other categories of animals or for saving feed of reasonable quality for the next dry period.

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REFERENCE

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Table 1

Least square means and standard errors for average daily gain during the experimental period (ADGE) for the whole period, and for age at slaughter, according to treatments.

Treatments	ADGE (g/steer/day)	Age of slaughter (months)
A - No supplementation	375 ± 12.4	28.4 ± 0.37
B - Suppl. 2nd dry season	445 ± 13.0	25.2± 0.39
C - Suppl. 1st dry season	445 ± 13.8	26.4 ± 0.42
D - Suppl. 1st and 2nd dry seasons	514 ± 15.1	23.6 ± 0.46
E - Suppl. 1st dry and feedlot 2nd seasons	645 ± 12.5	20.9 ± 0.37

Table 2

Least square means for average daily gain (g/steer/day), according to treatments and experimental years.

	Year 1		Year 2	
Treatments	Dry season	Wet season	Dry season	Wet season
Supplemented	490[a]	440[a]	580[b]	570[b]
Not Supplemented	70[b]	420[a]	-190[c]	850[a]
Feedlot	-	-	1280[a]	-

Means in the same column bearing different superscript letters are different ($P < 0.05$) by Tukey test.