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**EFFECT OF DIFFERENT STRATEGIES OF MANAGEMENT OF  
ELEPHANTGRASS ON PASTURE AVAILABILITY AND MILK YIELD OF  
CROSSBRED HOLSTEIN X ZEBU COWS**

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**Abstract**

The trial was done to study different strategies of pasture management on milk production of cows grazing Elephantgrass (*Pennisetum purpureum*, Schum.). The treatments were: Elephantgrass with 30 days of resting and fertilized monthly (30MF), fertilized every two months (30BF). Elephantgrass with 45 days of resting and a stubble height of 90-100 cm (45HS) or a stubble height of 40-50 cm (45LS). The stubble height for treatments 30MF and 30BF was 90-100 cm. The study was done using six crossbred Holstein x Zebu cows/treatment, with 100 days of lactation, on average. The experimental design was a completely randomized block design with two replication. The stocking rate was 4.5 cows/ha and no concentrate was fed. The pasture was fertilized with 200 kg/ha/year of N and K<sub>2</sub>O. It was also applied 40 kg/ha/year of P<sub>2</sub>O<sub>5</sub> and 1,000 kg/ha/year of dolomitic limestone. The average fat corrected (4%) milk yield was 10.3, 10.5, 9.3 and 9.2 kg/cow/day for treatments 30MF, 30BF, 45HS and 45LS, respectively. There were no effects ( $P>0.05$ ) of stubble height or fertilization frequency, but the treatments with 30-day resting produced more ( $P<0.05$ ) milk than those grazing at 45-day resting (10.4 versus 9.3). The overall average dry matter availability during the period was 1,652, 1,465, 1,821 and 1,707 kg/ha/cycle for the

treatments 30MF, 30BF, 45HS and 45LS, respectively, and there was no treatment difference ( $P>0.05$ ).

**Keywords:** Crossbred milking cows, *Pennisetum purpureum* Schum., resting period, rotational grazing, stubble height.

## Introduction

Elephantgrass (*Pennisetum purpureum*, Schum.) is a high yielding tropical forage, in general, well adapted to the Brazilian conditions, since it is cropped from North to South of Brazil. It is possible to get 15,000 kg/ha of milk during the 180 days of the rainy season (Deresz, 1994) using crossbred Holstein x Zebu cows. Deresz et al. (1994) reported daily average milk yield of 12 to 14 kg with crossbred Holstein x Zebu cows, grazing Elephantgrass during the rainy season, without concentrate supplementation. In this case Elephantgrass pasture was fertilized with 200 kg/ha of N and K<sub>2</sub>O, during the rainy season.

The resting period is an important factor in relation to the pasture management, since it interferes with the pasture quality, quantity, number of paddocks and milk yield response as reported by Deresz et al. (1994). The literature lacks information about the effect of different resting periods on milk yield on Elephantgrass pasture. However, Aroeira et al. (1999) found no effect of 30 versus 45 days resting period on milk yield or feed intake on Elephantgrass rotationally managed pasture, but there was significant effect on dry matter availability in favor of 45 days resting period.

The objective of this study was to compare 30-versus 45-day resting, two stubble height with 45 days resting and monthly and bimonthly fertilization with 30 days resting on dry matter availability and milk yield.

## Material and Methods

The study was carried out during the rainy season of 1995, using an area of Elephantgrass (*Pennisetum purpureum* Schum.) that have been utilized in grazing trials since

1988, annually fertilized with 200 kg/ha/year of N and K<sub>2</sub>O. The treatments were: Elephantgrass with 30 days of resting and fertilized monthly (30MF) or bimonthly (30BF). Elephantgrass with 45 days of resting and a stubble height of 90-100 cm (45HS) or 40-50 cm (45LS). The stubble height for 30MF and 30BF was 90-100 cm. The study was conducted using Holstein x Zebu cows, with 100 days of lactation, on average. The cows were allotted to the treatments in a completely randomized block design, based on body weight and milk yield. There was two area replication and three cows/replication. The stocking rate was 4.5 cows/ha and no concentrate was fed. Each paddock was grazed for three days. The pasture was fertilized with 200 kg/ha/year of N and K<sub>2</sub>O, divided in three or six applications (30BF and 30MF) and after each grazing cycle for the (45HS and 45LS). It was also applied 40 kg/ha/year of P<sub>2</sub>O<sub>5</sub> and 1,000 kg/ha/year of dolomitic limestone.

The stubble heights for all the treatments were established by hand cuttings the residue a day after the cows left each grazed paddock. The hand cuttings started on November 19<sup>th</sup> of 1994 and finished on January 5<sup>th</sup> of 1995. However, because of a short dry period observed in January the experiment started on February 5<sup>th</sup>. Most of the cows calved in October-November of 1994.

The forage dry matter availability was estimated monthly, one day before grazing period, using the hand plucked method observing the stubble height of each paddock. It was chosen a tall and a short tuft, in two places of each replication. To get the estimation of dry matter yield an area of 100 m<sup>2</sup> was used to obtain the number of tufts of each height to be able to estimate the dry matter yield, assuming that the tall tufts represented 50 %. A sample of this material was used to determine the chemical composition of forage.

The experiment finished on May 31, the beginning of the dry season of the year.

## **Results and Discussion**

The need to establish the stubble heights (hand cuttings) in treatments was one of the reasons for delaying the beginning of the trial. In treatments 45HS and 45LS there was a necessity to cut the stubble for every grazing cycle since the cows were not able to maintain the planned stubble heights probably due to the selectivity of grazing. Also the pasture grew to above 2 m high during each cycle especially in treatment 45LS, so the stubble was always higher than 40-50 cm high. The same problem with high stubble occurred in treatment 45HS but in a less severe form.

In treatments 30MF and 30BF with stubble heights of 90-100 cm, rarely, there was a necessity to adjust it and when it was necessary to do so, it was done only in small spots inside the paddocks.

The overall average dry matter availability during the rainy season was 1.652, 1.465, 1.821 and 1.707 kg/ha/cycle for treatments 30MF, 30BF, 45HS and 45LS, respectively (Table 1). There was no treatment effect ( $P > 0.05$ ) for the dry matter availability. The dry matter availability was higher for the 30MF and 30BF than for 45HS and 45LS treatments during January and February and lower during March and April, respectively. The reason for this may be related to the hand cutting management, adopted for all the treatments in the beginning of the trial, and for every grazing cycle on the 45LS treatment, since the stubble height was always higher than that planned. The average dry matter availability for the entire period probably was lower than normal values and the reason could be related to the short drought period occurred in January of 1995. However Aroeira et al. (1999) found similar values for Elephantgrass pasture grazed with 30 or 45 days of resting during the rainy season, in the same area, but in different years.

The average chemical composition of the forage hand plucked during the rainy season was 15.8, 15.9, 15.4 and 15.8 % of dry matter and 15.1, 14.5, 14.9 and 14.7 % of CP and 66.5, 67.1, 67.2 and 66.4 % of NDF, for the 30MF, 30BF, 45HS and 45LS treatments, respectively.

The overall average fat corrected (4 %) milk yield was 10.3, 10.5, 9.3 and 9.2 kg/cow/day for treatments 30MF, 30BF, 45HS and 45LS, respectively. There were no effects ( $P>0.05$ ) of stubble heights or fertilization frequency, but the treatments with 30-day of resting or regrowth produced more ( $P<0.05$ ) milk than those grazing at 45-day resting (10.4 versus 9.3 kg/cow/day). Similar results were observed by Deresz et al. (1994). However, Aroeira et al. (1999) observed no milk yield difference between 30 versus 45 days resting on Elephangrass pasture. Average 4% fat corrected milk yield in a weekly basis are shown in Figure 1.

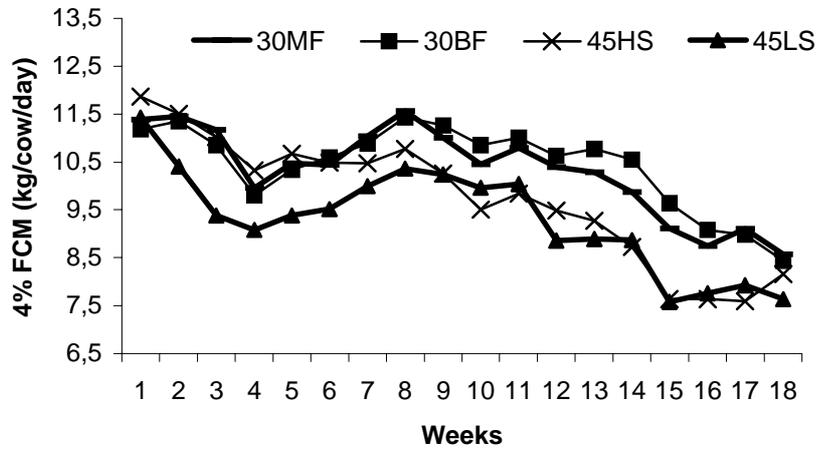
In conclusion, cows grazing Elephantgrass managed with 45-day resting produced less milk than cows grazing Elephantgrass with 30 days resting. There was no milk yield difference between the monthly and bimonthly fertilized treatments, neither between the 45 high stubble and 45 low stubble treatments.

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**Table 1** - Average dry matter availability (kg/ha) of Elephantgrass pasture managed with different resting periods during the rainy season of 1995.

Months	Treatments				Standard error
	30MF	30BF	45HS	45LS	
January	1,282	1,091	1,153	881	
February	2,041	1,921	1,783	1,561	
March	1,557	1,521	2,024	2,333	
April	1,727	1,327	2,324	2,052	
Mean	1,652	1,465	1,821	1,707	163.1



**Figure 1** - Milk yield (4% fat corrected) on Elephantgrass pasture managed with different resting periods during the rainy season of 1995.