GRAZING MANAGEMENT OF ELEPHANT-GRASS FOR MILK PRODUCTION

F. Deresz and L. L. Matos
EMBRAPA - Gado de Leite, Coronel Pacheco, MG, 36.155-000, Brasil.

ABSTRACT
The objectives of these experiments were to study the effects of three resting periods (RP) of elephant-grass pasture on milk production and composition of Holstein-Zebu cows. These trials were carried out during two consecutive rainy seasons (December to May) using 24 cows in each year. They were randomly assigned by blocks according to milk yield and live weight (LW) to four treatments: 30-day RP with no concentrate (30N), 30-day RP with concentrate (30C), 36 and 45-day RP with C (36C and 45C) in the first year. In the second year the treatments were: 30C, 30N, 36N and 45N. Concentrate was fed at the rate of 2 kg/cow/d. The paddocks were fertilized with 200 kg of N and K_2O and 40 kg of P_2O_5/ha/year. A preliminary statistical analysis showed that after adjusting milk production data for the intake of concentrate, there was no effect of year (P>0.01). Therefore the effects of RP and concentrate feeding were estimated from data of the two years combined. A regression analysis showed a decrease of 75.4 kg (SE = 35.84) of milk/ha for each day past the 30th day of regrowth (P<0.01). Concentrate supplementation showed a marginal increase (P<0.01) of 0.6 kg of milk per kilogram of concentrate fed.

KEYWORDS
Dairy cows, milk production, elephant-grass, rotational grazing, resting period, grazing management

INTRODUCTION
Reported dry matter (DM) yields of elephant-grass are superior to C3 species and other C4 grasses (Pryne and Mislevy, 1983). It was introduced in Brazil to be used for cutting and fed chopped to cattle, mainly during the dry season. With the increasing feeding and energy costs, pasture is being considered as a good alternative to reduce the costs of milk production. Productivity above 15,000 kg of milk/ha/year were reported by Deresz and Mozzer (1990) with crossbred Holstein-Zebu cows grazing elephant-grass with sugarcane plus 1% urea supplemented during the dry season. Resting period (RP) is a very important factor for grazing management of elephant-grass, since it influences forage quality, forage availability, milk yield, number of paddocks and costs with fencing. There is no comparative information on the effects of RP of elephant-grass on milk production. Hillesheim (1987) adopted 45, Deresz and Mozzer (1990) 30 and Caro-Costas and Vicente-Chandler (1974) 27 days of RP. The objectives of the present study were to determine the effects of RP of elephant-grass pasture as well as the effects of 2 kg/cow/day of a concentrate supplement on milk production and composition of crossbred Holstein-Zebu cows.

METHODS
Two experiments were carried out at EMBRAPA-Gado de Leite research station, located in Coronel Pacheco, state of Minas Gerais, in Brazil (21º 33' 22"S and 43º 06"W and 426 m above sea level). The climate class is CWa Köppen, with around 1,600 mm of precipitation concentrated (70-80%) in the spring-summer. The soil is a reddish-yellow latosol. Forty-eight crossbred Holstein-Zebu cows around 30 DIM were grouped on milk yield and live weight in six blocks of 4 cows in each of two consecutive rainy seasons. They were randomly assigned to four treatments: 30-day RP with no concentrate (30N), 30-day RP with concentrate (30C), 36-day RP with concentrate (36C) and 45-day RP with concentrate (45C) in the first year. In the second year the treatments were: 30C, 30N, 36N and 45N. Cows on C treatments were fed 2 kg/day of concentrate (20.5% CP and 32.5% NDF). The pasture, a pure stand of elephant-grass, was divided in 102 paddocks with 2 replicates per treatment in sequences of 11, 13 and 16 paddocks for 30, 36 or 45-day RP, respectively (with 3 days of grazing/paddock). The size of paddocks for the three RP were adjusted to maintain a fixed stocking rate of 4.5 cows/ha. This pasture had been established for nine years, with 1,000 kg of limestone and 100 kg of P_2O_5/ha. During these experiments, it was fertilized with 200 kg/ha/yr of N (ammonium sulfate) and 200 kg/ha/yr of K_20 (potassium chloride) divided in three applications (Nov, Jan and Mar). Super phosphate (200 kg/ha/yr) and limestone (1,000 kg/ha/yr) were spread together with the first N and K application (Nov), always after moving the cows to the next paddock. Cows were milked twice daily and milk composition and live weight determined weekly.

RESULTS AND DISCUSSION
A preliminary statistical analysis showed that after adjusting the data for concentrate intake, there were no effects of year (P<0.01). Therefore the effects of RP and concentrate feeding were estimated from data of the two years combined. Table 1 shows the average milk production per hectare and per cow that decrease with increasing RP. Despite the expected increase in dry matter on offer (DMO) per hectare with longer RP, DMO per cow decreases, mainly because of the reduced area allocated daily per cow at 36 or 45-day RP. At the same time, DMO with 30-day RP is higher in CP and IVDMD and lower in NDF content than 36 or 45-day RP (EMBRAPA-Gado de Leite, not published). A regression analysis showed a fall (P<0.01) of 75.4 kg of milk/ha (SE=35.84) for each day past the 30th day of regrowth (RP). Feeding 2 kg/cow/day of concentrate increased (P<0.001) milk yield by 1.2 kg/cow/d or 979 kg/ha in 6 months. This shows a high substitution rate, with an average marginal response of 0.6 kg of milk/kg of concentrate fed. Milk composition (3.8% fat and 3.1% protein) was not affected (P>0.10) either by RP or supplementation. Animals in all treatments gained weight during the experiments (32.5 kg LW/cow), indicating that the milk produced did not come from the mobilization of body reserves.

REFERENCES
Caro-Costas, R. and J. Vicente-Chandler. 1985. Milk production of young Holstein cows fed only on grass pasture over three successive lactations. J. Agric. Univ. Porto Rico. **58**:18-25.

Deresz, F. and O.L. Mozzer. 1990. Manejo de pastagem de capim-elefante para produção de leite e carne. Anais 1º Simpósio Sobre Capim-Elefante, Juiz de Fora. pp 155-172.

Hillesheim, A. 1987. Fatores que afetam o consumo e perdas de capim-elefante (*Pennisetum purpureum*, Schum) sob pastejo. Piracicaba, USP/ESALQ, 94p. MS Thesis.

Prine, G. M. and P. Mislevy. 1983. Grass and herbaceous plants for biomass. Soil Crop Sci. Soc. Fla. Proc. **42**:8-12.

Table 1
Milk production of Holstein-Zebu cows grazing elephant-grass with 30, 36 or 45 days of resting period, supplemented or not with 2 kg of concentrate/cow/d.

	Milk Production (kg/ha/180d)	SEM	Milk Yield (kg/cow/d)	SEM
Resting Period (days)				
30	10,459	12.9	224.1[a]	0.28[a]
36	9,659	11.9	316.9[b]	0.39[b]
45	9,355	11.5	316.9[b]	0.39[b]
Concentrate (kg/cow/d)				
0	9,335	11.5	236.2[a]	0.34[a]
2	10,314	12.7	236.2[a]	0.34[a]

[a,b] Standard error of the mean (8 and 4 observations/mean, respectively)