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VOLUNTARY INTAKE OF TANZANIA GRASS (*Panicum maximum*) UNDER ROTATIONAL GRAZING BY LACTATING COWS[1]

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Abstract

The study was conducted at Nucleo de Pesquisas Zootecnicas Nordeste of the Instituto de Zootecnia, Ribeirão Preto, SP, in a rotational grazing area of Tanzania grass (*Panicum maximum*), to estimate the dry matter intake by lactanting cows. The estimation of dry matter intake was calculated from the feces production estimated using extrusa Chromium-mordent and the in vitro digestibility of diet. The three treatments were crossbreed cows fed 3 kg.day^{-1} of concentrate, crossbred cows without concentrate suplementation and pure Gir cows also without concentrate supplementation. The milk production was 11.98, 6.53 and 5.46 kg per cow per day, the grass intake was 8.26 ± 5.66, 11.01 ± 5.37 and 9.55 ± 2.31 kg of dry matter per day or 2.15%, 2.37% and 2.34% of live weight for the three experimental groups respectively. The milk production was higher ($P<0.01$) for cows fed with concentrate. No difference was found for dry matter intake.

Keywords: dry matter intake, digestibility, marker indigested

Introduction

The Tanzania grass is a *Panicum maximum* variety produced by the Centro Nacional de Pesquisa com Gado de Corte (EMBRAPA) in 1990. This plant has a high mass production, up to 80% of leaves and supported 4,7 animal units (450 kg) per ha (Corsi and Santos, 1995). Also, this plant has a good adaptation and growth on low fertility soil, and is easily managed (Euclides et al., 1999)

The pasture dry matter intake affects animal performance because it determinates the intake of nutrients (Gomide, 1993). Studies to estimate the dry matter intake from pasture using the relation between the fecal production and the indigestible fraction of forage are recommended. (Aroeira, 1977). Also are recommended the utilization of material taken from esophageal fistulated animal (extrusa) because of the animal selection during grazing (Aroeira, 1997). The objective of this experiment was to estimate the dry matter intake in a rotating grazing area of Tanzania grass (*Panicum maximum*) by lactating cows.

Material and Methods

The study was conducted at the Nucleo de Pesquisas Zootecnicas Nordeste of the Instituto de Zootecnia, Ribeirao Preto, SP.

The experimental area had fourteen 1.13 ha pastures, with Tanzania grass (*Panicum maximum*), fertilized with 150 kg.ha $^{-1}$ of nitrogen per year, and managed in rotation with three days of occupation and 36 days without animals. The mean stocking rate was 2.1 cows. kg.ha $^{-1}$.

To evaluate the dry matter intake of the pasture 24 lactating cows were distributed in three groups as follows: eight pure breed Gir cows, on grass only, eight crossbred Gir x Holstein cows also on grass only and eight crossbred Gir x Holstein cows on grass and fed 3

kg of concentrate per day. The experimental design was a complete block design. The composition of the concentrate was 72.2% corn, 25.3% soybean meal and 2.5% minerals.

The grass dry matter intake was calculated from the estimate of the feces production and the *in vitro* dry matter digestibility using the following equation:

$$\text{Grass intake (kg DM.day}^{-1}) = \frac{\text{FP}}{1 - \text{IVDDM}}$$

where:

FP = total of feces produced per cow (kg de MS/day)

IVDDM = *in vitro* dry matter digestibility

Feces production was estimated using extrusa Cr-mordent (treatment with sodium dichromate, $Na_2Cr_2O_7H_2O$). Each animal received 30 g of extrusa Cr-mordent in the beginning of the experiment. The feces were collected after 6, 9, 12, 24, 32, 36, 48, 56, 72, 80, 96, 104 and 120 hours after the ingestion of marker.

The analyses of residual chrome in feces was made according to Willians (1962). The excreted feces curves was made from the model proposed by Pond (1989):

$$Y = \frac{Ko\, L_1 (t - \theta)\, e^{-(L1-\theta)}}{0.59635}$$

where

Y= marker concentration

K_0= initial marker concentration

L_1= passage rate

t = time after marker ingestion

θ = time until the first apparition of the marker in the feces.

The daily total feces (TF) production was calculated from the relation:

$$TF\ (g\ DM.day^{-1}) = \frac{\text{marker ingested}\ (\mu g)}{Ko\ (\mu g / g\ DM)\ K_1 * 24}$$

Where:

K_0= initial marker concentration

K_1 = passage rate of ruminal solid fraction

The statistical analyses was made using the SAS® (1992), program.

Results and Discussion

The total forage mass was 7340 kg.ha^{-1} at the time turning the cows into the paddocks and 5639 kg.ha^{-1} after the 3rd day of grazing. The proportion of leaves, stem and dead material was 62%, 30% and 8% after the 1st occupation day and 47%, 37% and 16% after the 3rd occupation day.

Table 1 shows the grass (extrusa) and concentrate composition and *in vitro* dry matter digestibility.

The average of milk production was 11.98, 6.53 and 5.46 kg per cow.day^{-1} for the crossbred Gir x Holstein cows fed 3 kg of concentrate, crossbred Gir x Holstein cows and pure breed Gir cows, both without concentrate, respectively. There was a difference ($P<0.01$) between crossbred cows fed concentrate and other groups but no difference between Gir and crossbred cows, both without concentrate supplementation.

The live weight of the cows (LW), grass and concentrate dry matter intake (DMI) and the relation between dry matter intake and live weight, in percentage, for the three experimental groups are presented in Table 2.

Even thought the Gir group produced less milk than the crossbred cows ($P<0.01$), there was no difference in grass dry matter intake, total dry matter intake and dry matter intake as a percentage of live weight.

Similar intake of Tanzania grass without supplementation of concentrate was observed by Euclides et al. (1993b), working with steers. In another experiment, Euclides et al. (1999), also working with steers, measured a dry matter intake of Tanzania grass equivalent to 2.46% of the live weight, also similar to the results presented in this work.

References

Aroeira, L.J.M. (1997) Estimativas de consumo de gramineas tropicais. In: TEIXEIRA, J.C. (Ed.) Digestibilidade em Ruminantes. Lavras: UFLA/FAEP. p. 127-163

Corse, M. e Santos, P. M. (1995). Potencial de Produção do Panicum maximum. Anais do 12º Simpósio sobre Manejo da Pastagem tema: O Capim Colonião. Anais.... Escola Superior de Agricultura "Luiz de Queiroz" FEALQ. Piracicaba. p.275-304

Euclides,V. P B., Thiago,L.R L.S., Oliveira, M.P. (1993). Consumo de forragem por novilhos pastejando cinco gramíneas. In: Reuniao Anual da Sociedade Brasileira de Zootecnia, 30, 1993, Rio de Janeiro, RJ. Anais... p.491

Euclides,V. P B., Thiago,L.R .L.S., Macedo, M.C. M., Oliveira, M.P. (1999). Consumo voluntario de forragem de tres cultivares de Panicum maximum sob pastejo**.** Rev. Soc. Bras. Zootec., **28**:1177-1185.

Gomide. J. A. (1993). Produção de leite em regime de pasto. Rev. Soc. Bras. Zootec., **22**:591-613.

Pond, K.R. (1989). Passage of chromium-mordanted and rare earth-labeled fiber: time of dosing kinetics**.** J.Anim. Sci., **67**:1020-28.

SAS users guide: statistics. Cary, SAS Institute Inc., 1992. 965p.

Willians, C.H. (1962). The determination of chromic using absorption spectrophotometer. J.Agric.Sci., **59**:381-5.

Table 1 - Composition of grass collected from esophageal fistulated animal (extrusa), and concentrate and *in vitro* dry matter digestibility.

		% of dry matter				
	DM (%)	CP	NDF	ADF	Ash	IVDMD
Extrusa	13.8	12.1	78.8	42.6	5.9	66.5
Concentrate	88.7	19.9	27.0	5.8	-	97.5

DM = dry matter, CP = crude protein, NDF = neutral detergent fiber, ADF= acid detergent fiber, IVDMD = extrusa dry matter *in vitro* digestibility.

Table 2 - Live weight of the cows (LW), dry matter intake (DMI) of grass and concentrate (Conc.) and the relation between dry matter intake and live weight, in percentage, for the three experimental groups.

Treatment	LW	DMI (kg. cow.$^{-1}$day^{-1})			% LW		
	kg.cow^{-1}	Grass	Conc.	Total	Grass	Conc.	Total
Supplemented crossbred cows	504[a]	8.26 ± 5.66	2.59	10.85	1.63	0.52	2.15
Not supplemented crossbred cows	495[a]	11.01 ± 5.37	-	11.01	2.37	-	2.37
Not supplemented Gir cows	418[b]	9.55 ± 2.31	-	9.55	2.34	-	2.34

[a,b] Means, in the same column, followed by different letters are different (P<0.01) by the Tukey test.