

Ingestive Behavior of Cows in Pastures *Andropogon gayanus* and *Brachiaria decumbens* in Southern State of Piauí, Brazil

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Abstract

The research was conducted at the experimental farm of the Agricultural College of Bom Jesus, which is located at 135 km 3 BR, in the region of the valley Gurguéia southern state of Piauí. We used 10 crossbred cows of Holstein x Gir. The experimental design was completely randomized with two treatments (the pastures of grasses *Andropogon gayanus* and *Brachiaria decumbens*), with five replicates (five animals per treatment). The trial lasted five days. Two evaluations were made with duration of 24 hours each, conducted during a day, and the average of the two ratings was used in the statistical analyzes. The evaluations were performed on 20 to 24 July 2013. The cows grazed more time in the morning around 7-10 hours and late afternoon extending into the night with peak until 19:00 hours. The idle time was greater at the end of the night that matches the period of reduced grazing activity. The cows grazed more time during the day in the pasture of *Brachiaria decumbens* (8.53 hours) compared to pasture *Andropogon gayanus* (8.03 hours). With respect to time grazing night, the situation was reversed, the animals grazed longer during the day and slowed down during the night (3.16 hours grazing) in the pasture of *Brachiaria decumbens*. The animals had a higher number of bits (14128.92) in grazing *Brachiaria decumbens* compared to *Andropogon gayanus* (10134.00).

Keywords: bits, animal behavior, loitering, grazing

1. Introduction

The feeding behavior of beef cattle or milk is influenced by the structure of the pasture and the heterogeneity of the spatial distribution of vegetation, characterized by a number of factors that can affect grazing behavior. According to (Maggioni et al., 2009), the nutritional value of available forage usually has great influence on the amount of forage consumed by ruminants.

A good performance in animals producing milk is a reflection mainly in its nutrient management and environmental effects that are submitted. Thus to improve the index created productive animals on pasture is good to know the pasture - animal interactions - environment.

Knowledge of animal behavior is essential for obtaining optimal conditions for rearing and feeding Swenson (1996). According (Pires et al., 2001), specifically bovine animals are capable of responding to different types of structures and variables pasture behavioral altering their levels in an attempt to survive. Thus, the basic concepts of power, combined with the knowledge of feeding behavior, should be used to increase productivity.

The feeding behavior or the act of swallowing animals is influenced by the stage of maturity of grass, palatability, feeding behavior of cattle matrices and structure of grassland being the main factor that affects the behavioral variables of consumption of animals. The potential of grassland is characterized by the quantity and quality of forage that is capable of producing. According to Forbes (1995), which further affects the consumption of forage is the height of available forage, which is closely related to the mass of available forage.

Thus, a basic objective of the whole system for cattle grazing is to meet the nutritional needs of animals throughout the year, keeping the permanent provision of food in sufficient quantity and quality, in order to get a satisfactory answer for productive part of the animals (Pardo et al., 2003).

This study aimed to compare the behavior of cows in pastures *Andropogon gayanus* and *Brachiaria decumbens* for possible differences in the time spent on grazing, rest, at the rate and total bites of animals.

2. Materials and Methods

The experiment was conducted at the experimental farm of the Agricultural College of Bom Jesus, belonging to the Federal University of Piauí which is located at 135 km 3 BR, in the valley Gurguéia southern state of Piauí. The region has a tropical climate conditions of the semiarid region that corresponds to the dry climate and high temperatures. Conducted during the summer dragging for fall, which is the period of the rainy season, common to all regions of northeastern Brazil. Formed pastures planaltina (*Andropogon gayanus*) and braquiariinha (*Brachiaria decumbens*) were used in a flat area of 1ha for each type of pasture. We used 10 crossbred cows of Holstein x Gir.

The trial lasted five days and the animals were already adapted to pasture. Two evaluations were made with duration of 24 hours each, conducted during a day, and the average of the evaluations was used in the statistical analyzes. The evaluations were performed on 20 and 24 July 2013. The experimental design was completely randomized with two treatments (the pastures of grasses *Andropogon gayanus* and *Brachiaria decumbens*), with five replicates (five animals per treatment), each picket comprised an area of 1 ha. The variables analyzed were total daily grazing time, grazing time, morning, afternoon grazing time, grazing time night, the total time of leisure, leisure time morning, afternoon leisure time, leisure time night, number of seizure per minute in the morning, afternoon, evening and the number of seizure diaries.

The grazing time and idleness were obtained by visual observations of the animals every 10 minutes and the total time the sum total of the times in which the animals were observed in a given state, based on the methodology described by (Costa et al., 2003).

Was regarded as one of the morning 07 to 12 h, the period from 12:00 hours to 19:00 and the period of the night included the interval between 19 and 07 h, the daily period comprised 24 hours of each day of observation. Grazing time understood the activities of search and seizure of material, while the leisure time referred to all the extras ruminating and grazing activities.

The seizure rate was obtained by counting the number of direct apprehension observed within one minute and the resulting average of observations every ten minutes, when the animals were grazing. The number of daily seizure was calculated by the product of the average rate of seizure and daily grazing time in minutes. The data relating to grazing times, the leisure and the rate and number of observed seizure diaries were submitted to analysis of variance and means were compared by Tukey test at 5% significance level, using the statistical program SISVAR, version 5.3.

3. Results and Discussion

In Figure 1, can be observed daily variations in the behavior of crossbred Holstein x Gir in pastures *Andropogon gayanus* and *Brachiaria decumbens*.

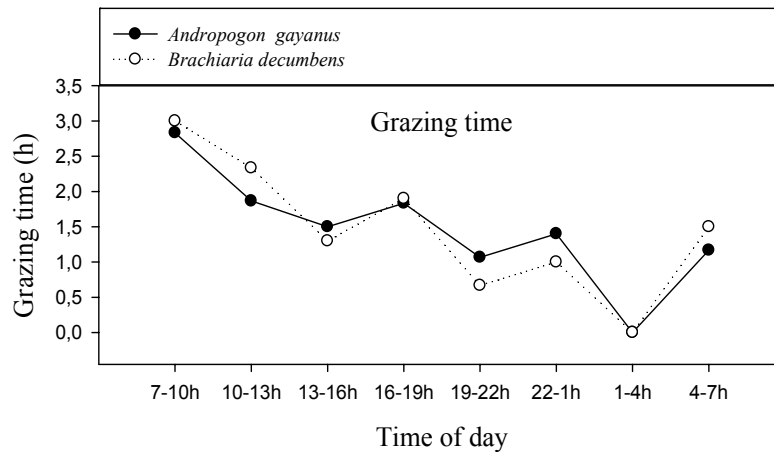


Figure 1. Changes in grazing behavior of cows in pasture *Andropogon gayanus* and *Brachiaria decumbens*

It can be seen that, as the feeding time, there were peaks in the early morning hours (around 7-10 hours) and late afternoon extending into the night (peak at 19:00 hours), which corresponds to the time that the animals were in grazing activity. Second (Vieira et al., 2007), similar behavior observed with heifers Girolando, where it was found more time grazing in the early morning and late afternoon, with peaks of grazing between 16h and 17h hours.

The animals grazed during the day, to a lesser extent in the period from 13 to 16 hours, extending to 1 am next in the pasture of *Brachiaria decumbens*. From that time, there was a reduction in grazing 4 hours till dawn. For animals that were grazing *Andropogon gayanus*, we can observe that there was a reduction of grazing from 1 hour, 4 hours back to grazing the next morning, just like in the pasture of *Brachiaria decumbens*.

In Figure 2, can be observed daily changes in leisure behavior of crossbred cows Holstein x Gir in pastures of *Brachiaria decumbens* and *Andropogon gayanus*.

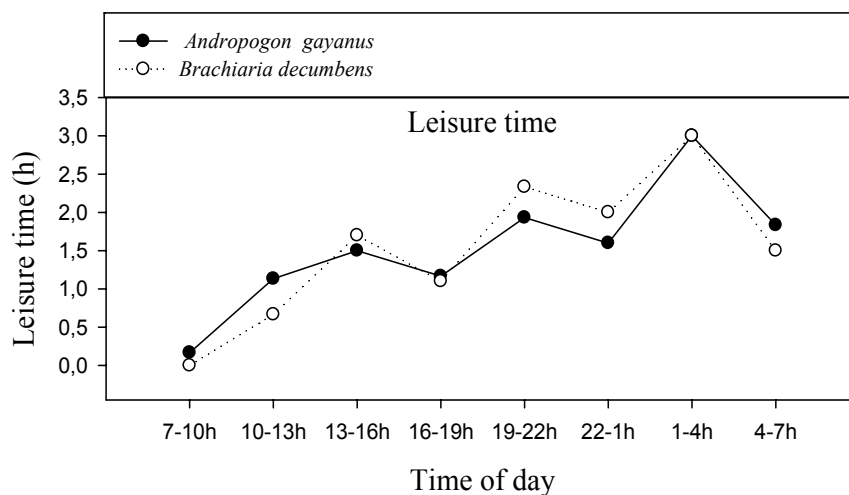


Figure 2. Changes in leisure behavior of cows in the pasture *Andropogon gayanus* and *Brachiaria decumbens*

We can observe that in both the two pastures *Andropogon gayanus* and *Brachiaria decumbens*, idle time was higher at the end of the night that matches the time when the animals are not exercising any ingestive behavior. According to Waring (1975), it was found that the animals related to half the day and the end of the night as the times of day with lower grazing activity.

In Figure 3, can be observed daily variations in the behavior of pieces of crossbred Holstein x Gir in pastures *Andropogon gayanus* and *Brachiaria decumbens*.

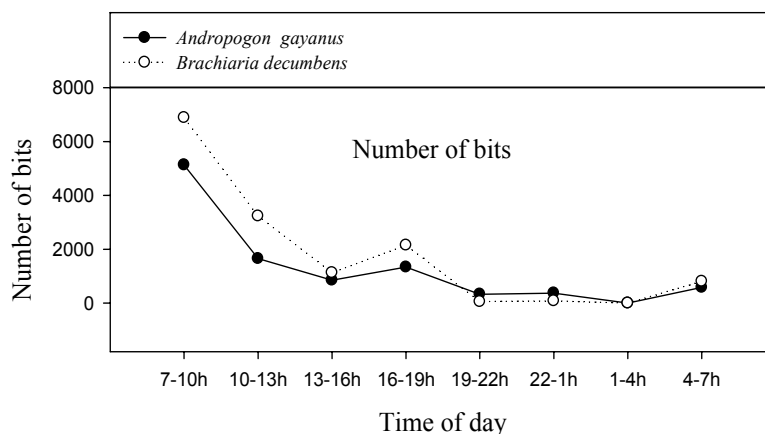


Figure 3. Variation in the behavior of bits of cows in the pasture *Andropogon gayanus* and *Brachiaria decumbens*

We can observe in Figure 3 that animals ingest more material in the morning and consequently the number of bits was the most intense peaks (7-10 hours). Therefore we evaluated the grasses *Brachiaria decumbens* realize that had the largest number of bits compared to *Andropogon gayanus* pasture in the morning hours, it actually had a more selective behavior of animals and acceptability of forage mass ingested. Already in the late afternoon and extending to the hours of the night (16-19 hours) the bit number had gradually increased.

According to Van Rees & Hutson (1983), intensive grazing occurred in the first four hours of the day, but also observed the same in the late afternoon, afternoons while the animals grazed intermittently. The number of bites during the day was less intense peak of (13-16 hours), extending to 1am following in both pasture evaluated. From that time, we realize that hears a reduction in the number of bits until 4 am. It is evident that the animals in the pasture *Brachiaria* started *decumbens* having a gradually increasing the number of bits following the 4 o'clock apart.

Results as described in Table 1, lists the times of heifers grazing pastures on both *Andropogon* and *Brachiaria decumbens gayanus*. There was a significant difference ($P < 0.05$), which observed that cows spent more time grazing during the day, but no significant difference ($P > 0.05$) in both types of pasture, this can be explained due to remain part of the night lying ruminating and also because the animals do not show preference for one of the fodder that were used in this experiment. Vieira et al. (2007) observed similar behavior in a study conducted with heifers Girolando, where it was found more time grazing in the early morning and late afternoon, with peaks of grazing between 16 and 17 hours.

Table 1. Grazing time of cows during daytime, night and day

Pasture	Grazing time (hours)		
	Daytime	Nightly	Daily
<i>Andropogon gayanus</i>	8,03 ^{aA}	3,63 ^{aB}	11,66 ^a
<i>Brachiaria decumbens</i>	8,53 ^{aA}	3,16 ^{aB}	11,70 ^a
CV (%)	17,65		12,25

Means followed by the same lowercase and uppercase in the column on the line do not differ ($P < 0.05$) by Tukey test at 5% level of probability.

With regard to night grazing, it was observed that there was no difference ($P > 0.05$) on types of grass used for feeding the cattle dies, possibly because of it being irrigated pastures and thereby make available green mass quality for foraging of animals. It was established that the evening had the lowest grazing time analyzed in the present study, which can be justified is that the animals at night are big part of the time lying ruminating as it is described in the nocturnal period in Table 2. Waring (1975), with a job in similar conditions, found that animals related to half of the day and the end of the night as the time of day lower grazing activity. In total daily grazing time, there was no statistical difference by Tukey test at 5% significance regarding the pastures studied, showing

that the animals under the conditions of this experiment have not changed the grazing habits of the measure that was modified type of grass, where there was a daily grazing time around 11 hours.

In Table 2 we observe that in general, the animals had a longer time in idleness during the night with a magnitude of 8.83 hours of leisure time compared to daytime, showing that cows had an increase of 255% in time spent in idleness when they were in the pasture of *Brachiaria decumbens*. We observed no significant difference for the two pastures *Andropogon* and *Brachiaria decumbens gayanus* by Tukey test ($P>0.05$), which is justified by higher peak number of bits and grazing occurred during the day, agreeing with grazing time which was lower during the night (Table 1), the cows spent more time lying down at night. According to Camargo (1988), the animals prefer to remain standing idle during the hottest hours of the day, while at night, keep lying.

Table 2. Leisure time for cows during daytime, night and day

Pasture	Leisure time (hours)		
	Daytime	Nightly	Daily
<i>Andropogon gayanus</i>	3,96 ^{ab}	8,36 ^{aA}	12,33 ^a
<i>Brachiaria decumbens</i>	3,46 ^{ab}	8,83 ^{aA}	12,30 ^a
CV (%)	16,75		11,62

Means followed by the same lowercase and uppercase in the column on the line do not differ ($P<0.05$) by Tukey test at 5% level of probability.

It was evident that the comparison of time in idle shifts hears rated daytime and nighttime differences significant at ($P<0.05$) in pastures *Andropogon gayanus* and *Brachiaria decumbens*. Already at the time in idleness daily noted mind showed a higher value in the pasture *Andropogon gayanus* and not hear a significant difference by Tukey test ($P<0.05$) in both pastures evaluated. Idleness can be defined as the period in which the animal is not eating, chewing or ingesting water, and has an average duration of ten hours daily Albright (1993).

In Table 3 it can be seen that the bite rate was lower for animals on pasture *Andropogon gayanus*, 9158.72 bits daytime, while for *Brachiaria decumbens* value was 13552.62 bits daytime.

Table 3. Mean values for the number of bits day, night and dairy cows in pastures *Andropogon gayanus* and *Brachiaria decumbens*

Pasture	Number of bits / minute		
	Daytime	Nightly	Daily
<i>Andropogon gayanus</i>	9158,72 ^{bA}	975,28 ^{ab}	10134,00 ^a
<i>Brachiaria decumbens</i>	13552,62 ^{aA}	576,30 ^{ab}	14128,92 ^a
CV (%)	12,53		24,23

Means followed by the same lowercase and uppercase in the column on the line do not differ ($P<0.05$) by Tukey test at 5% level of probability.

Table 3 shows the significant difference was observed for daytime with the highest bite rate for animals in the pasture of *Brachiaria decumbens* (13552.62) bits daytime, while for *Andropogon gayanus*, the value was (9158.72) bits day. This inferiority is due probably to the bovine opt for smaller pasture that was the *Brachiaria decumbens*. According Sbrissia and Da Silva (2001), the leaf: stem ratio has varied relevance according to the forage species, being lower in species of tender stem and lower lignification.

Regarding the total number of bits of the cows in the pastures of *Brachiaria decumbens* and *Andropogon gayanus*, the animals showed a number of pieces daily in the pasture of *Brachiaria decumbens* (14128.92), while in the pasture of *Andropogon gayanus*, this number was lower a (10,134.00) bits ($P<0.05$).

In Table 4 we can observe in general a significant difference for the two pastures *Andropogon gayanus* and *Brachiaria decumbens* ($P<0.05$). The rate of the number of bites per minute was lower for animals on pasture *Andropogon gayanus* (24.83) bits minute in the morning shift, while for the *Brachiaria decumbens*, the value was

(32.96) bits minute. Mendes et al. (2009) the increase in bit rate is a mechanism to maintain the rate of forage intake when changes occur in the pasture that provide lower bite mass. This variable is of the greatest importance in feeding behavior and explains the largest percentage of the variance in daily forage intake, since the bit rate and grazing time have secondary role Chacon and Stobbs (1976).

This inferiority was due, according to the opt more for cattle pasture with an average height of 30 centimeters, thus the pasture of *Brachiaria decumbens* showed up better for this characteristic. Lowers forage availability and especially the smallest blade: stem ratio may explain the more selective behavior of animals. According to Van Soest (1994), the increased consumption of sheets relative to the stem is assigned to more rapidly digested and the shorter retention time in the rumen, as well as greater accessibility and ease of apprehension.

Table 4. Mean values for the number of bites per minute morning, afternoon, evening and daily bits of cows in the pastures of *Brachiaria decumbens* and *Andropogon gayanus*

Pasture	Number of bits / minute			
	In Morning	In Afternoon	Nightly	Daily
<i>Andropogon gayanus</i>	24,83 ^{bA}	10,80 ^{aB}	4,43 ^{aB}	13,35 ^a
<i>Brachiaria decumbens</i>	32,96 ^{aA}	17,06 ^{aB}	2,97 ^{aC}	17,66 ^a
CV (%)		31,99		25,01

Means followed by the same lowercase and uppercase in the column on the line do not differ ($P < 0.05$) by Tukey test at 5% level of probability.

This result was higher than in the present experiment for animals in the pasture of *Brachiaria decumbens*, which was 24.83 bits per minute and returned to the lower animals in the pasture of *Andropogon gayanus*, 32.96 bits per minute. There was a significant difference ($P < 0.05$) related to shifts in the afternoon and evening for the *Brachiaria decumbens* pasture with higher number of bites per minute in the afternoon (17.06) and presenting a lower value on the night shift (2.97) number of bites per minute. It is noteworthy that the frequency of bites varies greatly with environmental conditions, and the structural quality of the pasture. According Paulino (2001), the attitude of grazing cattle to select a diet with the highest quality is a manifestation of the strategy to improve the nutritional balance.

Time total daily number of bites per minute, there was no statistical difference by Tukey test between the two pastures (*Andropogon gayanus* and *Brachiaria decumbens*), the animals showed a number of bits daily total (17.66) in the pasture of *Brachiaria decumbens*, while in the pasture of *Andropogon gayanus*, this number was less than 13.35 bits ($P > 0.05$).

4. Conclusion

The study of the behavior of grazing on grasses with different structures is suggested that grazing management strategies should take into account differences in grazing behavior. It was found that the cows had longer grazing in the morning regarding the daytime shift with a greater number of bits in the pasture *Brachiaria decumbens*.

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