Breeding Cows Body Condition and Dry Matter Availability in Natural Pastures under Rotational System

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Presenter Information

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Abstract

The livestock production in Rio Grande do Sul is based on natural pastures, which suffer great productive seasonality throughout the year, especially due to the quantitative and qualitative deficit that it goes through in the winter months. The existing dynamic between the animal and the forage is fundamental for a better reproductive performance of the brood cows, and consequently an increase of the productivity of beef cattle. The calf herd generation is, certainly, the fundamental element of the full cycle livestock. Knowing the potentiality and understanding the dynamism of the natural fields is a fundamental condition for the choice of adequate handling methods. The present work had as an objective the analysis of the existing correlations between the availability and quality of dry matter of natural pastures in relation to the body conditions of brood cows under a rotation pasture regime. The experiment was conducted in Santana do Livramento/RS, and comprised the period of March to October, 2019. For the determination of the forage mass, visual estimation and double sampling techniques were simultaneously used. The systematization of the experimental area and rotation order of the pickets were determined through a tool developed by the National Institute of Farming Investigation (INIA). The animals were visually evaluated through the body condition score (BCS). The results obtained regarding the availability of dry matter in kg/DM/ha were: 1594, 1159, 2332, 1464, 1048 and 2022. The measurements regarding the proportion of green matter on offer (%) prior to grazing of the animals, were: 65, 45, 35, 70, 70 and 55. The BCS evaluations at the end of each month were 2.98, 2.46, 2.73, 2.85, 3.15 and 3.15. The general body condition followed the trends in GM proportion (%, an indicator of quality) and the variation of DM/ha (quantity), and despite the physiological stage of the animals, there was a BCS evolution.

Introduction

The natural pastures of southern Brazil are recognized for their productive potential derived from climatic conditions suitable for the growth of a wide variety of forage species. In this way, natural pastures are the basis of the food of the gaucho herd, estimated at about 13 million cattle and 5 million sheep, in addition to being the habitat of a wide biodiversity of plants, birds and mammals, often endemic to this location (Garagorry, 2012).

Correct management of pastures is one of the most efficient ways to meet the needs of a production model that seeks, from animal feed based on pastures, to reduce negative impacts on the environment. In addition, it tends to reduce production costs and keep the process reproduction conditions accessible over time (Lenzi, 2003).

In general, greater individual gains have been achieved with extensive continuous grazing and a greater gain per hectare in rotational grazing (Garagorry, 2012), occurring in the former, intense degradation of pastures due to changes in botanical composition and increased erosion of the fields.

The rotating grazing system or “Voisin” is a method of grazing management that is characterized by dividing the grazing area into smaller plots or “paddocks”, which the animals enter when it has a sufficient amount of forage so that grazing is carried out and they leave when the forage level reaches a pre-established lower limit, moving on to the next picket not yet grazed (Voisin, 1974). In this way, the herd travels through all the paddocks, then returning to the first, when it again presents conditions to be grazed.

This study aimed to evaluate the relationship between the availability and quality of dry matter in natural pastures and their relationship with the body condition of breeding cows, managed in a rotated grazing system.

Methods and Study Site

The experiment was carried out between March and October 2019, in a natural pasture area in Santana do Livramento / RS, located in the Fronteira Oeste region of the state of Rio Grande do Sul, at coordinates 30°48'37.732"S and 55°42'32.321"W. An experimental area has a total of 47 hectares (ha), subdivided into 38

paddocks of approximately 1 ha each for the rotation of the animals and an area of 1.34 ha composed of waterplants and eucalyptus (*Eucalyptus* sp.).

53 pregnant Hereford and Braford female cows, aged between three and seven years from the beginning to the end of the experiment, were used. The animals were submitted to six visual assessments of body condition score (BCS), being classified between 1 to 5 (1 very thin and 5 very fat), on the last day of stay in the circuits.

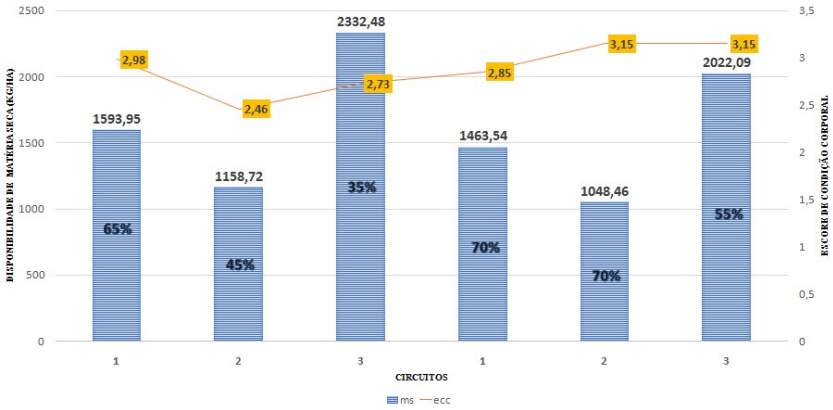
The grazing method used was rotary, with periods of two to three days of occupation in each paddock and a variable biomass supply. The forage mass (DM) was determined through the techniques of visual estimation and double sampling, to obtain the capacity support area in order to determine the animal load from the availability of dry matter per ha (kg DM / ha). Both techniques were performed before the animals entered the circuits. Three representative potreiros from each circuit were chosen and 20 visual samples and 10 cuts were made close to the ground, using squirrel scissors and a 0.25 m² square quadrat (Figure 7). In each of the estimates, three canopy heights were taken using a ruler graduated in centimeters.

To estimate the relationship between kg of dry matter (DM) per unit area (kg DM / ha) and animal load, regression analysis was performed, obtaining values of the coefficient of determination (R^2), in a Microsoft Office spreadsheet Excel.

Results

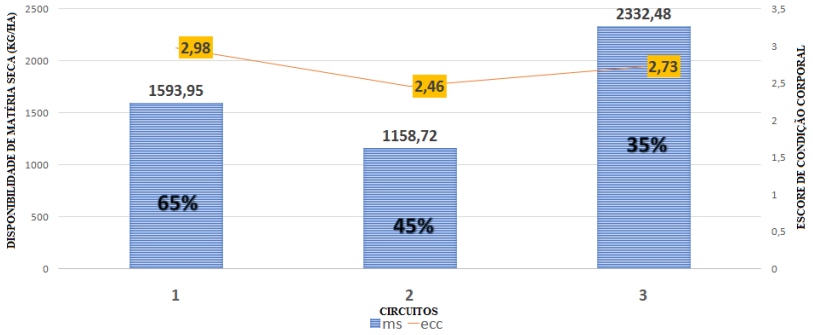
Each of the circuits (1, 2 and 3) had two different evaluation periods for two rotations of the animals in the experimental area (Figure 1). Circuit 1 was evaluated for the availability and quality of pre-grazing green matter (MV), first in April and then in July. At these times, 1,594 kg DM / ha and 65% GM and 1464 kg DM / ha and 70% GM, respectively, were obtained. Circuit 2 was evaluated in the months of May and September, obtaining 1159 kg DM / ha with 45% MV and 1,049 kg DM / ha with 70% GM, respectively. Circuit 3 in June reached 2,332 kg DM / ha with 35% GM and in October 2022 kg DM / ha with 55% GM.

Figure 1 - Availability of dry matter (kg / ha) and quality of green matter in relation to CTC of breeding cows during the experimental period.



Regarding the BCS of post-grazing animals in each circuit, the average evaluations of circuit 1 were 2.98 and decreased to 2.85. For circuit 2, it changed from 2.46 to 3.15 and circuit 3 increased from 2.73 to 3.15. It is observed that the availability of forage and the proportion of average green forage of the paddocks in the circuits were accompanied by the body condition of the cows. The first rotation of the animals (Graph 2) served to regulate the forage height of the circuits, since the vegetative canopy at the beginning of the experiment had high height and reduced nutritional quality. The natural pasture of circuit 2, different from the other circuits, obtained a smaller amount in kg / MS / ha and presented a high percentage of plants at the end of the reproductive phase and subsequent senescence. In this sense, allied to the end of autumn, there was loss of body condition of the animals to enter the posterior circuit. At the time of entry of animals in circuit 3, there was greater availability of DM / ha, but after grazing, the animals showed a lower BCS compared to circuit 1, which showed less availability of forage. This is probably due to the low quality of available green matter (only 35% green matter).

Figure 2 - Availability of dry matter (kg / ha) and quality of green matter (%) in relation to the BCS of breeding cows during the first rotation in the three circuits.

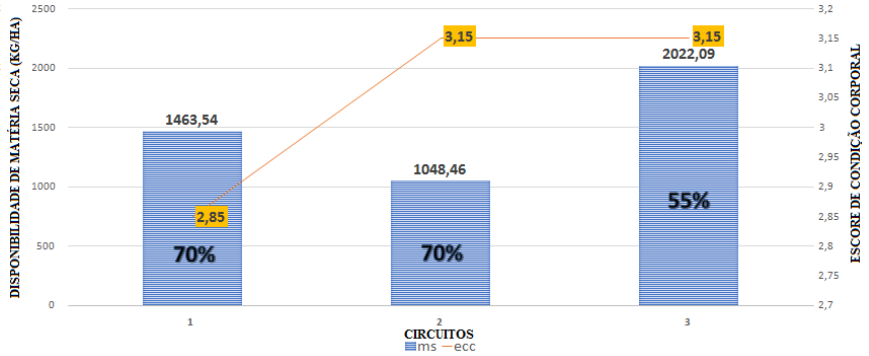


Carvalho et al. (2001) affirm that the structure of a pasture is a central and determinant characteristic both of the dynamics of growth and competition in the plant communities and of the ingestive behavior of the grazing animals.

One can also take into account the physiological state in which the animals were, since in an advanced gestational state the conversion of the ingested dry matter starts to prioritize the calf's weight gain (intrauterine).

After the animals first passed through the three circuits, circuit 1 was returned to the second rotation in the experimental area (Graph 3). When they entered the pickets of the first circuit, they had been at rest for 72 days. During this rest period, the plants obtained the necessary rest for regrowth and growth.

Graph 3 - Availability of dry matter (kg / ha) and quality of green matter (%) in relation to BCS of breeding cows during the second rotation in the three circuits.



It is observed that the BCS of the animals increased after leaving circuit 1 to circuit 2, and remained after passing through circuit 3. Despite circuit 2 presenting 415 kg DM / ha unless circuit 1 and the percentages of green matter are equivalent, the animals increased their body condition, due to the fact that the end of the winter season was approaching. It should be noted that at the time of departure of the animals in circuit 3, practically all the cows were calved. In this sense, it was expected that there would be a reduction in their BCS, due to the beginning of lactation and the consequent greater demand for nutrients. The result of BCS maintenance can be explained by the fact that circuit 3 went through the rest period between 07/30 and 10/15. In this way, they spent the whole month of August, September and half of the month of October accumulating reserves, and within the whole experimental period this was the most favorable for both.

When analyzing and comparing the second lap (period of July, September and October) with the first (April, May and June), it appears that the 3 circuits obtained less kg DM / ha compared to the initial period. However, the percentage of green matter increased complementarily, contributing to the recovery of the herd's body condition. This recovery is probably due to the fact of the quality of the pasture, which obtained a greater number of leaves and a smaller number of stems (less nutritious and palatable to the animals), in addition to the increase in protein content and low lignification.

It is noteworthy that the reduction in BCS of cows in the first shift occurred in late autumn and early winter, confirming the influence of forage quality. Corroborating the above, Rosa (2016) mentions that in colder periods, such as winter, there is a decrease in the growth rate of pastures, which provides fodder for animals.

The BCS gain of animals started at the end of winter and beginning of spring, as the plants obtained the necessary resting time for accumulating reserves, providing vigorous regrowth with greater nutritional value. This fact was important due to the fact that the herd started late September to early October. In this sense, the condition of cows giving birth with body condition between 3 and 3.5 stands out, as it is known that there is loss of postpartum BCS.

According to Jaume and Moraes (2001), cows with deficient body reserves at calving cannot face the nutritional demands of lactation without jeopardizing the resumption of reproductive activity. In the extensive systems in the region, a representative proportion of cows from beef herds arrive at calving with insufficient body condition to result in an acceptable breeding rate. These authors point out that cows with calving with body condition score 2, and that maintain this condition during mating, have a prenatal rate of less than 10%; whereas cows that present body condition 3 and 4 at birth reach rates close to 50% and 80%, respectively.

Current research confirms that cows have evolved even in late gestation and early lactation, with an increasing body condition score.

Discussion[Conclusions/Implications]

The creation of the systematization of the paddocks contributed, firstly, to regulate the forage mass and the height of the pasture and, secondly, to direct the animals to the best pastures. The amount of dry matter and the quality of green matter available in natural pasture influence the body condition of beef cows in rotational grazing system. The use of the ruler for the management of the natural field proved to be an instrument of high practicality and applicability in the rotational grazing system.

References

Carvalho, P. C. F. et al. Importance of pasture structure in the intake and selection of diets by the grazing animal. In: Mattos, W. R. S. (Org.). Animal Production In The View Of Brazilians, Piracicaba, **Anais** ... Piracicaba: Annual Meeting of the Brazilian Society of Zootechnics, 2001. p. 853-871.

Garagorry, F. C. Management alternatives for natural pasture submitted to rotational grazing. 2012. 210 f. Thesis (Doctorate) - Federal University of Santa Maria - Postgraduate Program in Animal Science, Santa Maria, 2012.

Jaume, C. M. and Moraes, J. C. F. A system to improve the reproductive rate in calves. Bagé: Embrapa Pecuária Sul, 2001. 14 pp. (Embrapa Pecuária Sul. Documents, 37).

Lenzi, A. Animal performance and forage production in two pasture use systems: Voisin continuous grazing & rational grazing. Florianópolis: Federal University of Santa Catarina, 2003. 122 p. Dissertation (Master Thesis) - UFSC, 2003.

Rosa, F. Q. Consumption and digestibility of the native pasture of the pampa biome and ryegrass inclusions. Uruguaiana, Federal University of Pampa (UNIPAMPA), 2016. 68p. Dissertation (Master in Animal Science), Federal University of Pampa, 2016.

Voisin, A. Pasture productivity. São Paulo: Mestre Jou, 1974.