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PERFORMANCE AND PRODUCTIVITY OF BEEF CATTLE IN OFF-SEASON PASTURE

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ABSTRACT

The crop-livestock integration system is a practice that aims at sustainability within the production chain of beef cattle. The objective of this study was to evaluate the performance and weight gain of beef cattle subjected to management in pastures of *Brachiaria brizantha* cv. BRS Piatã and *Brachiaria brizantha* cv. Paiaguás. A total of 5,656 animals were followed, being 3,280 crossbred (½ Angus & ½ Nelore) and 2,376 Nelore in a 1,900 hectares pasture area divided into 40 pickets of approximately 47.5 hectares each. The animals were weighed at the entrance and exit of the areas. The off-season pasture provided greater daily weight gain (0.800 kg/animal/day in crossbred animals and 0.717 kg/animal/day in Nellores). In relation to the productivity of kg of meat per hectare, higher production was observed in cv Piatã when compared to cv Paiaguás (97.98 kg/ha and 73.53 kg/ha, respectively). The use of off-season pasture increased the production capacity of the system, providing higher meat production and lower environmental impacts.

Key words: Gain; Crop-livestock integration; Sustainability

INTRODUCTION

Agribusiness is one of the sectors that has sustained the economy in Brazil, in 2020 had a growth of 24.31% equivalent to an increase of 387 billion, among this growth the branch of livestock had an increase of 24.56% (CEPEA, 2020). Being a sector that has such a large participation in the national economy, in recent years much has been demanded about a more sustainable production. Within this context the adoption of new technologies and breeding systems has intensified in beef cattle breeding.

The crop-livestock integration system (SILC) is one of the practices that aim for sustainability within the production chain, it allows grain production and animal breeding in the same area, which enables the increase in farm productivity without the need to increase the production area, thus reducing the demand for opening new areas for the implementation of pastures or crops.

The SILC also has the benefit of nutrient cycling, since cattle return to the environment via feces and urine part of the nutrients consumed, redistributing them in the soil. The cycling of certain nutrients such as K, for example, increases with grazing intensity (FERREIRA et al., 2011).

This integration when well employed provides biological and economic advantages, such as: high nutrient cycling, improved soil quality, income diversification, reduced risks of economic failure and increased income per area when compared to non-integrated systems (BALBINOT JUNIOR et al., 2009).

However, the objective of this study was to evaluate the performance and weight gain of beef cattle subjected to management in off-season pastures of *Brachiaria brizantha* cv. BRS Piatã and *Brachiaria brizantha* cv. Paiaguás cultivars.

MATERIAL AND METHODS

The study was conducted at São Miguel da Catequese farm, in the Nova Andradina / Mato Grosso do Sul, in the months of May to November 2017. A total of 5,656 animals were followed, being 3,280 crossbreds (½ Angus & ½ Nelore) and 2,376 Neloires in an area of 1,900 hectares of pastures divided into 40 paddocks of approximately 47.5 hectares each. The pastures were implemented after the soybean harvest (off-season pasture) in February/2017 by serial and mechanical sowing of the cultivars Piatã and Paiaguás.

To monitor the performance and weight gain of the animals, they were weighed at the entrance and exit of the areas, always after fasting for 12 hours. Batches of animals standardized in breed and weight were prepared weekly and transferred to the areas according to the time of implementation of the pastures, and the first batches entered the pastures approximately 100 days after sowing.

In order to remove the animals from the off-season pasture area in time for the agricultural practices of summer farming, and in order to be ready for sale and shipment to the slaughterhouses on the removal date, we applied as an estimate a daily weight gain of 800 g and a maximum permanence period of 150 days for the animals in the system. Thus, homogeneous lots of breed and weight were prepared, observing the entry weight of animals above 420 kg.

In order to evaluate the nutritional value of pastures, monthly collection of the paddocks was performed using the simulated grazing method and for the availability measurements the visual observation methodology was applied (HAYDOCK & SHAW, 1975).

Animal performance was evaluated using an entirely randomized design, considering the average gain of the animals in the batch as the measure to be compared. The T-Student test was applied at the 5% level to compare the mean weight and weight gain of the animals.

RESULTS AND DISCUSSIONS

The use of off-season pasture provided greater daily weight gain (DWG), and decreased the fattening time, DWG of 0.800 kg/animal/day was observed in crossbred animals and 0.717 kg/animal/day in Neloires (Table 1). Evaluating the effect of different types of supplements in the termination of Nelore cattle on *Brachiaria decumbens* pasture, Andrade et al. (2015) found a DWG of 0.42 kg/animal/day with protein-energy-mineral supplement, a gain 52.5% higher in the off-season pasture when compared to conventional.

In conventional systems, the daily gain in the dry period with the inclusion of 0.3% protein and energy supplement in the diet, ranged between 188 and 370 g/animal/day, values well below the results found in this study (HOFFMANN et al., 2014).

Weight gain may be associated with better quality forage, as it benefits from the residual fertilization of tillage and the chemical condition of the soil, which consequently enables significant gains per animal, thus meeting the nutritional requirements of the slaughter weight is achieved more quickly, and thus decreasing the fattening time, as observed in this study (ALMEIDA et al., 2015).

A genetic group effect (Crossbred x Nelore) was observed in DWG (Table 1). This effect may be associated with the productive potential resulting from the high level of heterosis and complementarity between breeds that originated from crossbreeding between the *Bos taurus* and *Bos indicus* groups (TOFFANI et al., 2010).

Table 1. Daily weight gain (kg/animal/day) of cattle on off-season pasture in the period from 05/13 to 11/13/2017 of crossbred steers (½ Angus & ½ Nelore) and Nellores.

Item	Breed		P-value
	Crossed	Nelore	
Average	0.800 ^a	0.717 ^b	0.043
Standard deviation	0.171	0.150	
Item	Forrage		P-value
	Piatã	Paiaguás	
Average	0.764 ^a	0.666 ^b	0.041
Standard deviation	0.188	0.187	

^aAverages in the row followed by the same letter do not differ statistically.

Dias et al. (2015) when comparing pre-weaning performance between genetic groups: Nelore and ½ blood Angus-Nelore (F1) also found significant differences in DWG (0.683 ± 0.08 and 0.821 ± 0.14 , respectively).

Regarding the productivity of kg of carcass per hectare, higher production was observed in cv Piatã when compared to cv Paiaguás (97.98 kg/ha and 73.53 kg/ha, respectively), this result can be justified by the contents of CP and TDN that were higher in cv Piatã (Table 2). Sekiya (2019) working with the same cultivars in SILC found no significant differences for animal performance as well as in the chemical composition of the cultivars.

Table 2. Livestock production, gross values in reais per area and nutritional value of off-season pastures with cvs. Piatã and Paiaguás between May and November 2017.

Item	Forrage				
	Piatã		Paiaguás		P-value
Kg body weight per hectare	188.42 ^a		141.41 ^b		
Kg carcass per hectare ¹	97.98 ^a		73.53 ^b		
@ per hectare	6.53 ^a		4.90 ^b		0.041
R\$ per hectare ²	1,959.60		1,470.60		
	Nutritional Value				
Crude protein ³	19.0	10.7	14.6	9.2	
Total digestible nutrients ³	58.4	55.4	55.9	54.1	
Neutral detergent fiber ³	61.0	68.2	66.8	71.3	
Dry Matter (ton/hectare)	7,83	1,74	6,95	2,38	

^aAverages in the row followed by the same letter do not differ statistically; ¹Yield considered to be 52%; ² Considering current @ values of R\$ 300.00; ³ Values based on dry matter (%).

Off-season pasture decreases fattening time and increases productivity in kg of carcass per hectare. Other advantages have been observed, such as the decrease in methane emission in the cycle due to the better nutritional value of the forage and consequent weight gain. The animal gaining weight faster and earlier will reach its slaughter weight and thus less food will be consumed throughout the

cycle, consequently reducing the emission of enteric methane, resulting in less CH₄ per kg of meat produced (BERCHIELLI et al., 2012).

CONCLUSIONS

The use of off-season pasture has increased the production capacity of the system, providing higher meat production and lower impacts on forests and deforestation, consequently improving sustainability.

REFERENCES

- ALMEIDA, R. G.; MACEDO, M. C. M.; ZIMMER, A. H.; KICHEL, A. N.; ARAUJO, A. R. Sistemas mistos como alternativa para a intensificação da produção animal em pastagens: integração lavoura-pecuária e lavoura-pecuária-floresta. In: SIMPOSIO SOBRE MANEJO DE PASTAGEM, 27., 2015, Piracicaba, SP. Sistemas de produção, intensificação e sustentabilidade da produção animal. **Anais...** Piracicaba, SP: FEALQ, 2015. p. 57-82. Available at: <<https://www.alice.cnptia.embrapa.br/handle/doc/1024520>>
- ANDRADE, A. T.; ROSSI, R. C.; STIVAL, V. P.; OLIVEIRA, E. A.; SAMPAIO, A. A. M.; ROSA, B. L. Diferentes suplementos na terminação de bovinos Nelore em pastagem diferida de *Brachiaria Decumbens* no período da seca. **Boletim de Indústria Animal**, Nova Odessa, v.72, n.2, p.91-101, Mar. 2015. Available at: <<http://www.iz.sp.gov.br/pdfsbia/1435341898.pdf>>
- BALBINOT JUNIOR, A. A.; MORAES, A.; VEIGA, M.; PELISSARI, A.; DIECKOW, J. Integração Lavoura-Pecuária: intensificação de uso de áreas agrícolas. **Ciência Rural**, Santa Maria, v.39, n.6, p.1925-1933, set, 2009. Available at: <<https://www.scielo.br/pdf/cr/v39n6/a229cr838.pdf>>
- BERCHIELLI, T. T.; MESSANA, J. D.; CANESIN, R. C. Produção de metano entérico em pastagens tropicais. **Revista Brasileira de Saúde e Produção Animal**, Salvador, v.13, n.4, p.954-968 out./dez., 2012. Available at: <<https://www.scielo.br/pdf/rbspa/v13n4/10.pdf>>
- CEPEA. Centro de Estudos Avançados em Economia Aplicada. **PIB do Agronegócio Brasileiro**. CEPEA-USP, São Paulo, 2020. Available at: <<https://www.cepea.esalq.usp.br/br/pib-do-agronegocio-brasileiro.aspx>>
- DIAS, L. L. R.; ORLANDINI, C. F.; STEINER, D.; MARTINS, W. D. C.; BOSCARATO, A. G.; ALBERTON, L. R. Ganho de peso e características de carcaça de bovinos Nelore e meio sangue Angus-Nelore em regime de suplementação a pasto. **Arquivos de Ciências Veterinárias e Zoologia da UNIPAR**, Umuarama, v.18, n.3, p.155-160, jul./set. 2015.
- FERREIRA, E. V. O.; ANGHINONI, I.; ANDRIGHETTI, M. H.; MARTINS, A. P.; CARVALHO, P. C. de F. Ciclagem e Balanço De Potássio e Produtividade de Soja na Integração Lavoura-Pecuária Sob Semeadura Direta. **Revista Brasileira de Ciência do Solo**, v.35, p.161-169, 2011. Available at: <<https://www.scielo.br/pdf/rbcs/v35n1/a15v35n1.pdf>>
- HAYDOCK, K. P.; SHAW, N. H. The comparative yield method for estimating dry matter yield of pasture. **Australian Journal of Experimental Agriculture and Animal Husbandry**, Melbourne, v.15, n.76, p.663-670, 1975.
- HOFFMANN, A.; MORAES, E. H. B. K.; MOUSQUER, C. J.; SIMIONI, T. A.; JUNIOR GOMES F.; FERREIRA, V. B.; SILVA, H. M. Produção de bovinos de corte no sistema de pasto-suplemento no período seco. **Nativa**, Sinop, v.02, n.02, p.119-130, abr./jun. 2014. Available at: <<https://periodicoscientificos.ufmt.br/ojs/index.php/nativa/article/view/1298>>

SEKIYA, B. M. S. **Produção de Bovinos de Corte em Pastagens de BRS Paiaguás e BRS Piatã em Sistema de Integração Lavoura-Pecuária**. 2019. 51f. Dissertação (Mestrado- Produção Animal) - Universidade Estadual Paulista – Unesp, Faculdade de Ciências Agrárias e Tecnológicas de Dracena, Dracena. 2019. Available at: <https://repositorio.unesp.br/bitstream/handle/11449/191593/Sekiya_bms_me_dra.pdf?sequence=5&isAllowed=y>

TOFFANI, P. R. P.; TULLIO, R. R.; NASSU, R. T.; PINHEIRO, M. B.; WADA, T. C.; FERREIRA, A. U. de C. Avaliação da qualidade sensorial da carne bovina proveniente de cruzamento entre raças adaptadas e não adaptadas. In: JORNADA CIENTÍFICA, 2., 2010, São Carlos. **Anais...** São Carlos: Embrapa Pecuária Sudeste, 2010. p.1. Available at: <<https://www.alice.cnptia.embrapa.br/alice/bitstream/doc/865737/1/PROCIRRT2010.00163.pdf>>