

# Canopy changes of brachiaria managed under continuous stocking in the dry-water transition

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**Key words:** herbage allowance; protein supplementation; trough.

**Abstract:** Pasture supplementation is an alternative to take advantage of the forage mass deferred in the rainy season and maintain or provide weight gain in periods of rain absence. The objective was to compare the structural characteristics, mass production, density and population demography of tillers of *Urochloa brizantha* cv. Paiaguás and *Urochloa spp.* cv. Convert under fixed and continuous stocking with steers supplemented with pelleted concentrate supplied in the trough or on the ground in the water/dry transition period. The experiment was carried out in the Jatai Federal University, from March to June 2020, in a completely randomized design and a 2 x 2 factorial scheme, using six paddocks/treatment. SAS was used considering repeated measures (RM) at 5% to do variance analysis. There was a significant interaction between Brachiaria and the method of supplementation for basal tiller, aerial and total tiller density. Convert-grass had an average of 551 basal and 577 total tiller/m<sup>2</sup>. Paiaguas grass presented higher tiller density (1,028 vs. 582 tiller/m<sup>2</sup>) and higher tiller birth rate (12.92 vs. 9.14%) than Convert. No significant difference was observed between the brachiarias. The average height of Paiaguas-grass was 62.34 cm and 50.70 cm for Convert-grass. The average height was 57.83 cm and on the ground it was 54.90 cm. Supplementation offer method changed Paiaguas canopy. The Convert showed higher leaf and dead mass production but lower weeds despite its smaller tillering.

## Introduction

Pasture supplementation is an alternative to take advantage of the forage mass deferred in the rainy season and maintain or provide weight gain in periods of rain absence. Pasture characteristics that allow the description of its structure are relevant in the evaluation of pastures because they influence the ingestive behavior, the digestibility and the animals performance and allow the forage quality evaluation. Then, determination of the pasture morphological components mass of the pasture are essential (Santos et al. 2010).

Understanding forage productive potential and the its morfo-structural characteristics is important for the selection of correct management practices that will promote pasture perennity while granting an adequate supply of good quality mass for grazing. Thus, knowledge of how the tillering forage occurs is one way to reach high productivity in the pastures throughout the year and at same time looking for its perennity.

The objective was to compare the mass production, tiller density and demography of *Urochloa brizantha* cv. Paiaguas and *Urochloa spp.* cv. Convert under continuous stocking of steers supplemented with pelleted concentrate supplied in the trough or on the ground in the water/dry transition period.

## Materials and Study Site

The experiment was carried out in the Beef Cattle Sector at Jatai Federal University, in Southwestern region of Goias State, from March to June of 2020. The total monthly rainfall measured at the experiment locally decreased from 103.0 mm (March) to 6.6 mm (June) and average temperatures fell from 24.3 to 19.0°C. It was evaluated *Urochloa brizantha* cv. Paiaguas and *Urochloa spp.* cv. Convert with two different supplementation methods (in-trough and on-ground) in three cycles, using 36 Nellore steers, averaging 24 months of age. There were used continuous and fixed stocking of 2 ua/paddock. The steers were distributed in 12 paddocks, being six with in-trough supplementation and six with on-ground supplementation. Protein pelletized supplement was provided once a day, at 10:00 am.

To determine total dry mass (DM), three areas/paddock of 0,25 m<sup>2</sup> were collected to the ground with scissors. Samples were separated in botanic fraction (brachiaria and weeds) and morphologic fraction,

leaf, stem, dead mass and inflorescence. Then, these fractions were weighed, dried, milled, homogenized and quartered to obtain a representative sample to dry on an oven-dried at 105°C and calculate dry matter and crude protein production (Silva & Queiroz 2002) as well as their percentages and ratios.

In each paddock, three points were chosen in which sward was representative of the average grass height and at each of these places a PVC ring measuring 350 mm in diameter was installed. Evaluations of tiller dynamics and demography were performed by counting basal and aerial tillers and conducting vessels of aerial and basal tillers.

The completely randomized design was adopted and variance analysis was performed with software SAS following the GLM procedure, considering repeated measures and 5% significance.

## Results and Discussion

There was a significant interaction between forage and supplementation method for the basal, aerial and total tillers density and for supplementation method for the Paiaguas-grass.

Convert-grass had an average of 551 basal and 577 total tiller/m<sup>2</sup>, which indicates that there was no representative presence of sap conducting vessels to the aerial tillers.

Paiaguas grass presented higher tiller density (1,028 vs. 582 tiller/m<sup>2</sup>) and higher tiller birth rate (12.92 vs. 9.14%) than Convert, which can demonstrate higher resilience and probability of this grass produce a perennity pasture. No significant difference was observed between the brachiarias, as refers to the supplementation method, for sap conducting vessel density and tiller mortality rate (Table 1).

**Table 1. Basal and aerial tillers density (DBA), conducting vessels of basal (VCB) and aerial tillers (VCA), total tillers density (DT), birth (TN) and mortality tillers rate (TM) and conducting vessels of tillers basal and aerial density (DVCBVCA) in Paiaguas and Convert grazed by Nelore animals being supplemented on the ground and in the trough**

Variables	Paiaguas		Convert		Pr> F
	on-ground	in-trough	on-ground	in-trough	
DBA (tiller/m <sup>2</sup> )	946	624	551	551	0.0476
DT (tiller/m <sup>2</sup> )	1,029	675	582	572	0.0001
DVCBVCA	53		31		ns
TN (%)	12.92		9.14		0.0083
TM (%)	55		58		ns

The average height of Paiaguas-grass was 62.34 cm and 50.70 cm for Convert-grass. In the paddocks where the supplementation was offered in the trough, the average height was 57.83 cm and on the ground it was 54.90 cm.

The highest tillering observed in Paiaguas when the supplementation was offer on-ground could be explained by higher forage defoliation stimulated for the supplementation method.

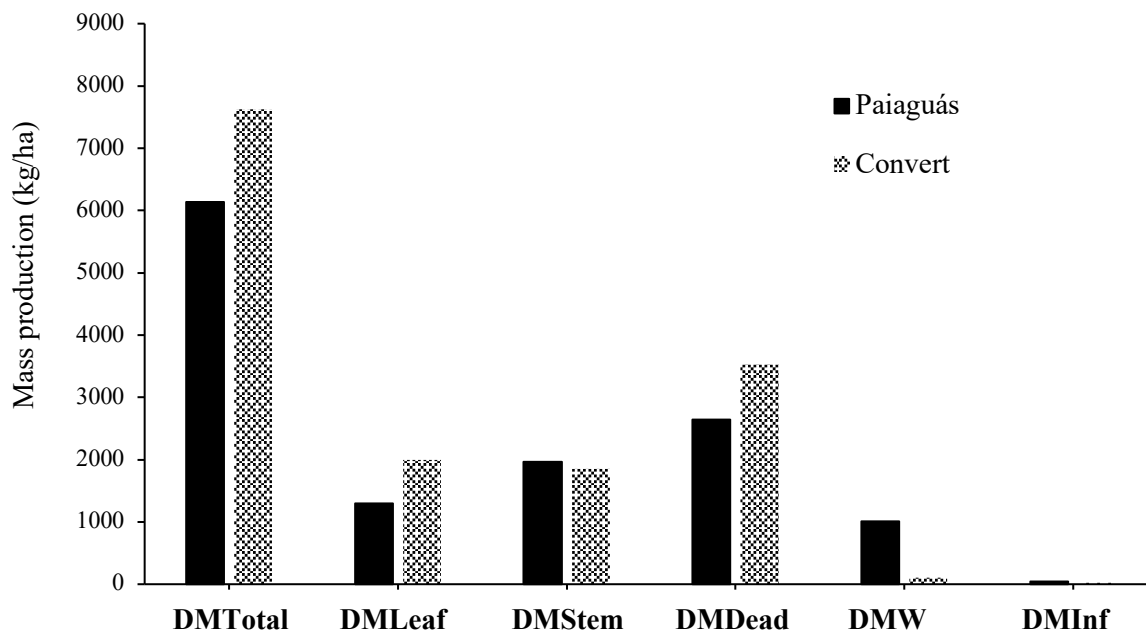
Stocking rate of just 2 ua/ha resulted in an under grazed canopy condition which permitted an excessive forage grown and the apical meristem exposition. When tillers were defoliated by ruminant livestock, they had its meristem decapitated, which caused great tiller mortality.

On the other hand, lower birth rate indicates that lower light quantity and, most important, lower light quality is achieving lower canopy strata (Rosa 2015).

The higher tiller birth rate in Paiaguas-grass occurred at the end of collects, probably, due to apical meristem decapitation and tiller mortality which permitted that more light achieving lower canopy strata, which stimulated new tillers birth.

According to Fiori et al. (2016) the regenerative capacity of foliar tissue is one of the most reasons why tropical grasses persist after defoliation, since the apical meristem remains preserved below the defoliation level. When the apical meristem is eliminated, tillering through the basal gem crown becomes a most important process. In this cases there will appear both tillers sap conductors, basals and aerals, changing all the canopy form, perennity and functionality.

The Convert dry matter production was higher than for Paiaguás grass, 7,622 and 6,137 kg/ha, respectively. Normally, higher DM values are related to plant age, but in this experiment it was observed that dead matter production was significantly larger in Convert grass (3,530 vs. 2,646 kg/ha) which may explain its higher total dry mass production. Paiaguás samples grass displayed the smaller leaf production (1,292 vs. 1,995) and the larger weeds production (1,011 vs. 105 kg/ha), which could explain the higher dead material production from Convert grass (Fig. 1).



**Figura 1. Total dry matter production (DMTotal), leaf mass (DMLeaf), stem mass (DMStem), dead mass (DMDead), weeds mass (DMW) and inflorescence mass (DMInf), in kg/ha, in four collects of Paiaguás and Convert, in experimental period during dry-water transition (May to June)**

## Conclusion

Supplementation offer method changed Paiaguás canopy.

The Convert showed higher leaf and dead mass production but lower weeds despite its smaller tillering. And it could mean that this grass presents greater ability of dominance, despite the Paiaguás tillering more, indicating greater resilience when the supplement was provided on-ground, probably, due to the substitutive effect observed by the great quantity dead material mass.

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