Brachiaria spp. (Syn. *Urochloa spp*.) cv. Mulato II (Convert HD364) mass production under continuous grazing in the water/dry transition period

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Abstract: In the transition period between the rainy and dry seasons there is decreased water, temperature and luminosity, reducing forage production and quality. Because of this variability in forage mass production, it is essential to quantify forage mass for use in planning and decision making about pastures management. The objective was to evaluate *Brachiaria spp.* (Syn. *Urochloa spp.)* cv. Mulato II (Convert HD364) growth, biomass production managed under continuous grazing with steers fed with protein supplement feed in-trough and on-ground during the seasonal transition period. The experiment was carried out in the Beef Cattle Sector of Jatai Federal University (UFJ), Brazil, from March to June 2020, in a completely randomized design, using 18 male Nellore steers at 24 months of age, with two animals per paddock. Variance analysis was performed by SAS software using the GLM procedure and time repeated measures with significance set to $P < 0.05$. There was no significant difference between way of supplementation. In the rainy/drought transition period, Convert-grass produced 7,622 kg DM/ha and 1,995 kg DM/ha of leaf mass. The pelleted protein supplement can be used both in-trough or with on-ground because the method of feeding did not change the forage offered but the canopy was undergrazed which could biased the responses to the supply method evaluated.

Introduction

Understanding forage productive potential and its morpho-structural characteristics is important for the selection of correct management practices that will promote pasture perennity while granting an adequate supply of good quality biomass for grazing. Grazing animal behavior is related to plant structure and if under grazing occurs, it will result in stem elongation and dead material production and accumulation, thus reducing forage mass quality. To comprehend and plan strategies for grazing management requires considering the morphological responses of tropical forages after grazing, since they will later condition animal and plant restrictions.

Ability to regenerate leaf tissue is one of the main advantages of tropical forage grasses, as it provides for pasture perennity after the grazing period. Results may vary according to grazing conditions as defined by management (intensity, frequency and severity of grazing), since those, together with fertilization and weather conditions, will determine leaf disappearance rates by defoliation. The lack of knowledge of the physiological, morphological and ecological characteristics changes of grasses in response to different environments and defoliation regimes may result in several problems, perhaps the most important is the degradation of soil and pasture (Santos et al. 2011).

The CONVERT HD364, trade name given to the hybrid Brachiaria cultivar Mulato II (CIAT 36087), was obtained by the Tropical Climate Forages Project of CIAT (International Center for Tropical Agriculture), as a result of the progenies selection of three generations after crosses between *Brachiaria ruziziensis* x *Brachiaria decumbens* x *Brachiaria brizantha*.

The objective of this experiment was to evaluate *Brachiaria spp.* (Syn. *Urochloa spp.)* cv. Mulato II (Convert HD364) growth, mass production and accumulation rate, managed under continuous grazing stock with steers fed with protein supplement during the transition from rainy-to-dry-season period in the Brazilian savanna.

Methods and Study Site

The experiment was carried out in the Beef Cattle Sector at Jatai Federal University, in Southwestern

region of Goias State, Brazil, from March to June of 2020. The total monthly rainfall measured at the experiment location decreased from 103.0 mm (March) to 6.6 mm (June) and average temperatures fell from 24.3 to 19.0ºC. It was evaluated *Brachiaria spp.* (Syn. *Urochloa spp.)* cv. Mulato II (Convert HD364) with two different supplementation methods (in-trough and on-ground) in three cycles, using 18 Nellore steers, averaging 24 months of age. There were used continuous and fixed stocking of three animals per paddock. The steers were distributed in six paddocks, being three with in-trough supplementation and three with on-ground supplementation. Protein pelletized supplement was provided once a day at 10:00 am.

To determine total dry mass (DM), three areas per paddock of 0.25 m^2 were collected to the ground with scissors. Samples were separated into 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 obtained a representative sample to calculate dry matter, as well as their percentages and ratios.

The completely randomized design was adopted, and variance analysis was performed with software SAS following the GLM procedure using Mauchly's sphericity test to validate a repeated measures analysis of variance (ANOVA). When Mauchly's Test was significant Multivariate Test was used (Wilk's Lambda) to compare treatments and when Mauchly's Test wasn't significant Univariated Test was used.

Results and Discussion

There was no difference between supplementation method and analyzed average variables can be seen in Table 1.

Table 1. Percentual and production of mass, leaf, stem, dead mass, brachiara mass, weeds mass, and their ratios from Convert-grass HD364 under grazing with steers supplemented in-trough and on-ground from march to June of 2020

Variable	Production				Proportion	
	Biomass		Dried Matter		%	Pr > F
	(kg/ha)	Pr>F	(kg/ha)	Pr>F		
Total	18,05±6,62*	0.59	7,62±2,69	0.59	-	
Leaf	6,55±3,62	0.96	1,99±1,01	0.52	50.14±8.26	0.95
Stem	6,22±2,31	0.60	1,86±632	0.32	49.85±8.26	0.95
Herbage	-	-	-	-	52.13±10.46	0.77
Dead	5,28±1,90	0.44	3,53±1,34	0.61	47.86±110.46	0.77
Brachiaria	-	-	-	-	98.41 ±9.80	0.81
Weeds	327±725	0.84	105±266	0.74	2.64±9.80	0.47
Inflorescence	82±79	0.22	20±20	0.25	-	-
Leaf:stem ratio	-	-	-	-	1.08±0.34	0.80
Brachiaria:weeds ratio	-	-	-	-	62.57±139.76	0.10

* Standard deviation

Total mass production of 18,05 t/ha was high, but the leaf:stem ratio (1.08) was extremely low. This can be explained by the forage higher growth rate since, even in the months of May and June, despite of the rainfall shortage, higher heights 47.1 cm were observed in sward. In the other words, grass growth was much higher than expected for the transition period of the seasons. Under continuous grazing conditions, adequate grass sward height for Convert-grass should be no higher than 30 cm (Silva 2020; Euclides et al. 2016) to maintain the desired pasture structure and better nutritional value. The adequate structure is related to high leaf:stem ratio or higher leaf percentage. Silva et al. (2017) found 69.70% of leaf percentage for Convert-grass and 4.55 to leaf:stem ratio while, in this study, just 50.14% of the mass was leaf. Santos et al. (2014) observed 7,75 DM t/ha which is the same value observed here. The growth of

tillers of Convert-grass during the entire experimental period was 1.44 cm/day (Fig.1). And this growth interfered and changed all ratios (Fig. 2), and consequently, grass nutrition value, animal performance and next-season pasture structure and yield. Dry matter stem production (1,86 ± 632 kg/ha) was the same as leaf production (1,99 ± 1,01 kg/ha) but there were 2.64% weeds in the canopy which indicate that the pasture management could be better conduced. The average canopy height indicates undergrazing. In the other words, the number of tester animals used, three steers/paddock (2 animal unit/paddock or three steers of 300 kg LW/paddock) , was below the pasture support capacity and thus insufficient to maintain the best canopy structure in both treatments, supplement supply in-trough and on-ground which means that there was no effect of treatments over the mass intake and it is possible supply the supplement to the animals in-trough and on-ground. This can mean great savings in production systems that use supplementation as a strategy to reduce the time the animal spends on pasture during the water/dry transition period or any other period in which it is intended to work, for example, with sequestration of animals seeking to preserve mass in the pasture and, at the same time, increasing weight gain per unit area, since troughs are expensive attachments.
There was also stem elongation and reducing the leaf:stem ratio and, consequently, high percentage of dead material (47.86%).

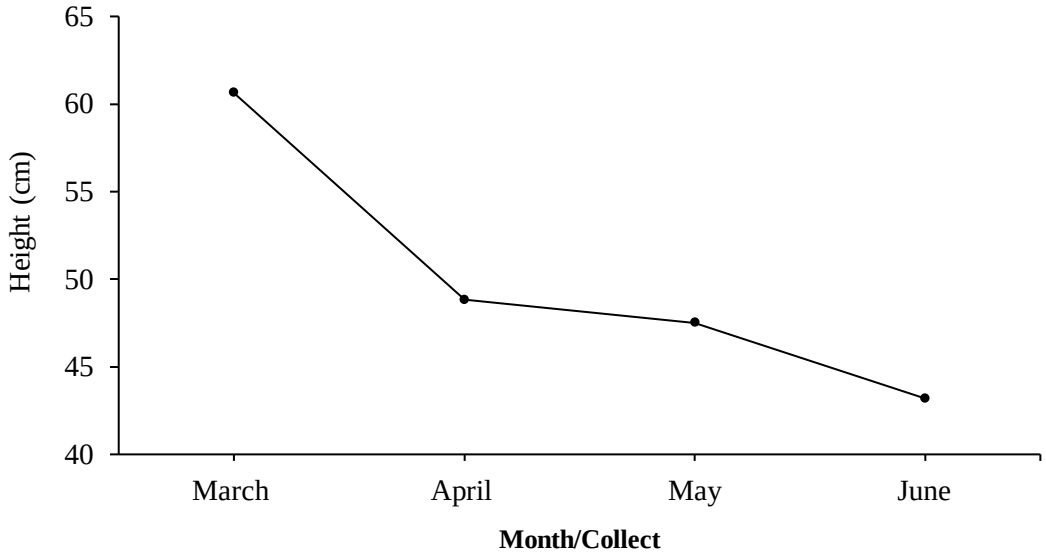

Figure 1. Average forage canopy height of Convert-grass under continuous stocking rate in four collects from March to June of 2020

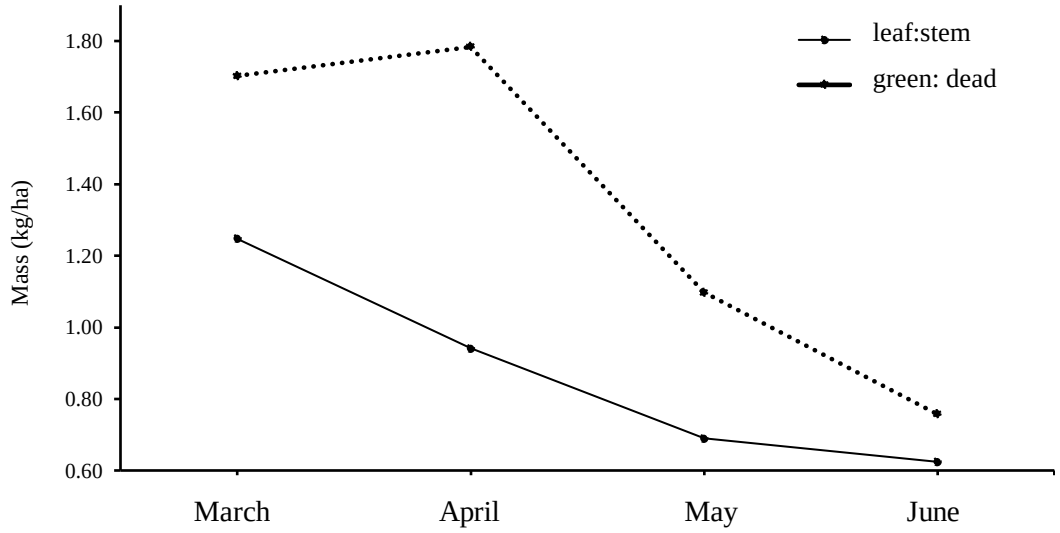

Figure 2. Convert leaf:stem and biomass:dead mass ratio from March to June of 2020

Conclusions

Convert-grass growth and biomass production managed under continuous grazing with steers fed with protein supplement feed in-trough and on-ground during the seasonal transition period was the same so, the use of the trough is optional but the canopy was undergrazed which could biased the responses to the supply method evaluated.

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