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FIBER AND DIGESTIBILITY OF PIATÃ GRASS IN SYSTEMS IN INTEGRATION

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ABSTRACT
This work aimed to evaluate the fiber contents and digestibility of Piatã grass (*Urochloa brizantha* cv. Piatã) leaf blade in a crop-livestock-forest integration system. The experiment was carried out at Embrapa Beef Cattle, agricultural year 2018/2019. The experimental design was in randomized blocks with the treatments arranged in subdivided plots, with 3 treatments (ICLF28, ICLF22 and ICL) and 4 repetitions. The evaluation months were from January to May 2019. The Piatã grass was harvested at ground level, in a 1 x 1 m sample area, the harvested material was taken to the laboratory, weighed, the Piatã grass was morphologically separated and dried in an oven with forced air circulation at 55 ºC. After removal from the oven, the leaf blade, stem + sheath and senescent material components were crushed in a mill with a 1 mm sieve, and the crude proteion contents were determined; NDF; ADF; IVOMD and IVDMD, by means of reflectance spectroscopy in the near infrared (NIRS). It was found that for the NDF contents, the ICLF28 system presented higher values, and lower IVOMD contents were observed with the ICL system.
Key words: neutral detergent fiber; acid detergent fiber; *in vitro* digestibility of organic material

INTRODUCTION

The ICLF system is an intentional combination of agricultural, livestock and forestry activities, carried out in the same area, in intercropped crop, in succession or rotation. However, there are options for cultivating crops and livestock: ICL; crop and forestry: ICF; livestock and forestry: ILF; of the three activities: ICLF. According to Balbino et al. (2011) this components combination brings several benefits to the implantation site, especially the productive capacity recovery of the pasture in degraded soils and the use intensification of the area without harm to any resource.

The grasses *Urochloa brizantha* (Marandu, Xaraés and Piatã), *U. decumbens* (*B. brizantha* cv. Basilisk), *Panicum maximum* (Aruana, Mombaça and Massai) are considered tolerant to shading and with satisfactory forage production in silvopastoral systems (ALMEIDA et al., 2011).

A pasture structure can be defined as the distribution and arrangement of components of the aerial part, such as forage accumulation, plant height, leaf density, leaf/stem ratio and senescent material proportion (Simon et al, 1987). Therefore, an evaluation of the pasture structure becomes important in shaded systems. Shaded pastures have in their structure, for example, a lower canopy height and dry forage mass, but with a higher crude protein content and *in vitro* organic matter digestibility, a reduction in the neutral detergent fiber contents (ALMEIDA et al., 2011).

In shaded systems the forage nutritive value can be affected and it becomes a basic factor to be considered, as animal production is influenced by this factor, reflecting on improvements without weight gain. Improvements in the forage composition under intense shading have been observed by several authors (PACIULLO et al., 2007; SOARES et al., 2009).

Gamarra (2015), in the 5th year of evaluation when comparing the ICL system with the ICLF, observed improvements in the forage composition in the ICLF system in relation to the ICL, with crude protein contents of 10% without ICLF and 7.3% without ICL; 70.3% NDF without ICLF versus 72.5% without ICL in the summer. This work aimed to evaluate the fiber contents and digestibility of Piatã grass (*Urochloa brizantha* cv. Piatã) leaf blade in a crop-livestock-forest integration system.

MATERIAL AND METHODS

The experiment was carried out at the Technological Reference Unit in Agrosilvipastoral systems, from Embrapa Beef Cattle, in Campo Grande-MS, Brazil. The region is located in the Cerrado biome, with an average annual rainfall of 1,560 mm, with defined seasons of rain from September to April and drought from May to August.

The experimental area used was composed of three systems: Integrated Crop-Livestock-Forest system with 28 m of eucalyptus rows (ICLF28); Integrated Crop-Livestock-Forest system with 22 m of eucalyptus rows (ICLF22); Integrated Crop-Livestock (ICL) system.

The experimental design was in randomized blocks with the treatments arranged in subdivided plots, with 3 treatments in the plots (ICLF28; ICLF22; ICL) and 4 repetitions. The harvest months were January, February, March, April and May 2019 and the sample points A, B, C, D and E made up the subplots.

In each of the samples, with a sample area of 1.0 m x 1.0 m, Piatã grass was harvested using a gasoline side harvester. The harvested material was taken to the laboratory, weighed to obtain green mass yield.

Subsequently, the separation of the Piatã grass fractions in a leaf blade, stem with sheath, senescent material was carried out in the laboratory. These fractions were packed in paper bags and placed in a forced air circulation oven at a temperature of 55 ºC for three days. After taen out from the oven, the samples were weighed to obtain dry matter values and sent for grinding.

The leaf blade, stem + sheath, senescent material components were crushed in a mill with a 1 mm sieve, packed and sent to the laboratory to determine the neutral detergent fiber (NDF) content; acid detergent fiber (ADF); *in vitro* organic matter digestibility (IVOMD) and dry matter (IVDMD). These determinations were performed by means of reflectance spectroscopy in the near infrared (NIRS), according to Marten et al. (1985).

The data were subjected to analysis of variance and the means were compared using the Tukey test at 5% probability. The analyzes were performed using the SISVAR statistical package (FERREIRA, 2008).

RESULTS AND DISCUSSIONS

There was no interaction among the systems and the sampling months for any evaluated variables (Table 1). Regarding the leaf blade ADF and IVDMD variables, no difference was observed among the systems. The highest *in vitro* organic matter digestibility of (IVOMD) of the leaf blade were observed for ICLF22 and ICLF28.

The mean ADF contents varied from 29.39 to 34.65%, and are within the mean normally registered for tropical grasses. According to Nussio et al. (1998), forage with values around 30% (ideal content for good animal intake), or at least, will be intake at high levels, while those with contents above 40%, at low levels.

Table 1. Neutral detergent fiber (NDF), acid detergent fiber (ADF) and *in vitro* organic matter digestibility (IVOMD) and *in vitro* dry matter digestibility (IVDMD) contents of the Piatã grass leaf blade in ICL systems, ICLF22 and ICLF28 in the different months of sampling.

System / Month	**NDF**	**ADF**	**IVDMD**	**IVOMD**
System		%		
ICL	68.29 C	30.36 A	60.99 A	64.09 B
ICLF22	69.74 B	30.40 A	61.30 A	65.98 A
ICLF28	71.90 A	31.89 A	62.16 A	66.09 A
CV	2.28	2.29	3.07	1.59
P value	0.04	0.01	0.01	0.02
Month		%		
January	63.08 C	33.88 A	69.91 B	70.78 A
February	65.46 B	34.65 A	71.48 A	69.45 B
March	68.94 A	29.39 C	70.40 A	67.90 B
April	65.76 B	3210 B	68.32 B	71.30 A
May	66.78 B	32.07 B	67.19 C	70.87 A
CV	2.15	3.17	3.4	2.99
P value	<0.01	<0.01	<0.01	<0.01

Means followed by the same uppercase letter in the column do not differ by the Tukey test (P>0.05).

Regarding the NDF, the lowest contents were obtained in the ICL (68.29%) and in the month of January (63.08%). Euclides (1995), studying several forage grasses cultivars, concluded that NDF values below 55% are rare and values above 65% common in new tissues, while contents between 75% and 80% are found in physiological maturity forage.

In a shaded location, the lower pasture obtained a higher NDF, which is consistent with the idea that the growing leaf under shading tends to increase the fiber amount due to the addition of supporting tissues for leaf elongation in search of light (SOUZA et al., 2007).

According to Van Soest (1994), contents greater than 60% of NDF in dry matter limit the forage intake. The mean contents found in this research are above those established by this author, but they are in agreement with Aguiar (1999), who states that tropical forages have high NDF contents, generally above 65%, reaching 80%. This is an unfavorable characteristic for grasses, since the increase in fiber content limits the foragequality and its intake.

For the variable IVOMD, higher values were observed for the ICLF systems and for the months of April and May. High temperatures promote rapid leaf growth and development and increase in the cell wall content components and, as a consequence, also the participation of this component in the total dry matter of the plant. According to Wilson (1983), these effects are negatively correlated with IVDMD.

Gerdes et al. (2000) found, in general, that the autumn and winter seasons provided IVDMD around 6.9% and 11.2% higher than in the spring and summer, in the Marandu and Tanzania grasses, respectively.

CONCLUSIONS

The ICLF28 system showed higher NDF contents. The lowest IVOMD content was obtained with the ICL system.

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