# CRUDE PROTEIN OF PIATÃ GRASS LEAF BLADE IN SYSTEMS IN INTEGRATION

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**ABSTRACT**
This study aimed to evaluate the crude protein contents of Piatã grass (*Urochloa brizantha* Piatã) leaf blade in a crop-livestock-forest integration system. The experiment was carried out in the area of Embrapa Beef Cattle, in Campo Grande – MS, Brazil, in the 2018/2019 agricultural year. 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, the following distances from the eucalyptus rows: ICLF28 (7m, 10m, 11m, 9m, 4m); ICLF22 (3m, 7m, 10m, 7m, 3m). The sampling locations were identified by letters A, B, C, D, E (North-South direction). The Piatã Grass was harvested at ground level, the material obtained was separated into leaf blade, stem with sheath and senescent material. The samples were taken for drying and after drying they were ground and subjected to crude protein analysis. The higher crude protein contents in the leaf blades were verified in the months of February, in the three system.
**Key words:** nutritional value; stem; senescence

## INTRODUCTION

Brazilian pastures are in an evident degradation degree due to their exploitation without the proper nutrients replacement and without the use of conservationist practices. Currently, degraded pastures occupy an area of approximately 80 million hectares in the country (CRUSCIOL et al., 2014). Given this scenario, the search for alternatives that reverse the soil quality loss, aiming at increasing plant production in conjunction with animal production, is increasingly frequent. Among the available alternatives, we can highlight the integrated agricultural production systems (IAPs), which allow the soil fertility increase and nutrient cycling, reversing the soil degradation process. Among the IAPS modalities, the integrated crop-livestock-forest (ICLF) stands out, with significant benefits to the soil, the forage and, through the use of the tree component, to the animal performance (BALBINO et al., 2011). The integrated crop-livestock-forest system has several advantages over other systems. The trees presence in this system increases the thermal comfort for animals through the shade offered, in addition, they contribute to the soil fertility improvement through the leaves that fall on the soil, and are mineralized by environmental actions. However, several authors report that shading can cause changes in forage crude protein contents in integrated systems compared to those under full sun (Paciullo et al., 2011). Thus, in order to understand this dynamic, research is needed to assess variations in crude protein contents in integrated systems. The aim was to evaluate the crude protein content of Piatã grass leaf blades in integrated crop-livestock-forest systems.

## MATERIAL AND METHODS

The experiment was carried out at the Technological Reference Unit in Agrosilvipastoral systems of Embrapa Beef Cattle in Campo Grande-MS, Brazil. The soil in the area has a flat relief, being classified as a Dystrophic Red Latosol with a clay texture. The experiment area has been used with succession cycles since 2008.The experimental design was a randomized block with 4 repetitions, with the treatments arranged in subdivided plots, with 3 treatments in the plots (ICLF28; ICLF22; ICL). In the subplots, the harvest months (January, February, March, April and May 2019) and the sample points (A, B, C, D and E) were allocated. In perpendicular transect to the tree rows in each plot, five equidistant points were defined (A, B, C, D and E), where A and E were 1 m from the tree trunks; and C corresponded to the intermediate position; totaling 5 sample points per plot. The 28 m Integrated Crop-Livestock-Forest system and the 22 m Integrated Crop-Livestock-Forest system have distances between different sampling points, due to the eucalyptus rows distance of each system. In order to evaluate the Piatã grass accumulated dry mass yield, it was harvested at ground level by means of a gasoline side harvester. The material obtained was taken to the laboratory and separated into the following fractions: leaf blade, stalk with sheath and senescent material, then they were identified, and taken to dry in a forced ventilation oven at a mean temperature of 55 to 60 $^{o}$C until reaching constant mass. After drying, the leaf blade samples were weighed to determine the dry matter content and corrected by them. Subsequently, the samples were ground in a Willey mill, and packed in plastic pots, and subjected to crude protein analysis according to AOAC (1990). 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 statistical software SISVAR (FERREIRA, 2008).

## RESULTS AND DISCUSSIONS

Table 1 shows crude protein values of leaf blade in the ICL, ICLF22 and ICLF28 systems, in the different sampling months. There was an effect of the interaction (P <0.05) between the sampling system and month on the crude protein (CP) percentage in the Piatã grass leaves.

Table 1. Crude protein (CP) contents in the Piatã grass leaf blade in the ICL, ICLF22 and ICLF28 systems in the different sampling months.

| System | January | February | March | April | May | CV | P value |
|---|---|---|---|---|---|---|---|
| ICL | 13.59 Bb | 21.04 Aa | 16.16 Aa | 14.39 Bb | 16.09 Aa | | |
| ICLF22 | 17.84 Aa | 19.05 Ab | 15.94 Ba | 14.66 Bb | 15.98 Ba | 8.70 | 0.013 |
| ICLF28 | 17.09 Aa | 18.88 Ab | 14.49 Bb | 17.52 Aa | 14.36 Bb | | |

Means followed by the same letter, lower case in the column and upper case in the row, do not differ by the Tukey test (P> 0.05).

For the monoculture ICL system, the months that presented the highest crude protein values were the months of February, March and May. The ICLF22 system obtained the best crude protein values in the months of January and February. The ICLF28 system obtained the best values for protein in the months of January, February and April. The highest crude protein percentages for the Piatã grass leaf blades were obtained in February, in the three systems, this probably occurs because Piatã grass presents early flowering, and from February, in which the days are longer, the grass quality reduces significantly (EUCLIDES et al., 2008), and consequently the leaf blades crude protein content of is also affected. Euclides et al. (2008) evaluating the effect of animal grazing on the forage production and on the pasture structural components of the cultivars Marandu, Xaraés and Piatã of *U. brizantha,* verified that the Piatã grass leaf blade:stalk ratio reduced, demonstrating that this cultivar loses quality during the water season. Martins et al. (2020) evaluating animal performance and Piatã Grass nutritional characteristics in two integrated systems during the summer and winter in Campo Grande – MS, Brazil, verified during the summer leaf blades crude protein contents of leaf blades of 10.5 and 7,7% in the crop-livestock-forest and crop-livestock integration system, respectively. In winter, these authors verified crude protein contents of 13.5 and 11.2% in leaf blades for the crop-livestock-forest and crop-livestock integration system, respectively. The results found by Martins et al. (2020) were lower than those found in the present study in all evaluated seasons, as shown in Table 1. The results found by Martins et al. (2020) demonstrate that in the winter season, the crude protein contents in leaf blades were higher, while those found in the present study, demonstrate that in February, in the summer, the highest were found crude protein content in leaf blades. The results found in the present study are probably justified by the effect of rainfall indicators, given that February is one of the months with the highest rainfall in relation to the rest of the year, which may have promoted an improvement in the Piatã Grass quality, and consequently leaf blades.

## CONCLUSIONS

The highest crude protein percentages for Piatã grass leaf blades were obtained in February, in the three systems.

## ACKNOWLEDGMENTS

The authors would like to thank the Coordenação de Aperfeiçoamento de Pessoal de Ensino Superior (CAPES, Coordination for the Improvement of Higher Education Personnel) for granting the scholarship.

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