Nutritive value of hybrid progenies of *Panicum maximum*

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INTRODUCTION: The warm season forages have important role in Brazilian production system, providing low-cost food and making our product competitive in the international market. This production system have a high demand for new cultivars more adapted. The releasing of new cultivars in Brazil has been done by the evaluation of adaptability of accessions collected in the nature, but its process is finite. The genetic recombination is another way to obtain variability and can contribute to the releasing of hybrid cultivars. The Panicum maximum is an apomictic plant that has high potential to pasture diversification. The nutritive value of forage plant has been left in background in the forage breeding process probably due to importance of dry matter yield to increase the directly the productivity. When the demand for more productive plants is met, the forage quality takes more importance as a way to improve the pasture productivity. So it is important to study the genetic potential of some cultivars to be included in the breeding program. Thus, the study was conducted to evaluate the nutritive value of hybrid progenies of Panicum maximum and its potential to the breeding process.

MATERIAL AND METHODS: The experiment was carried out at Embrapa Beef Cattle in Campo Grande, Mato Grosso do Sul. Hybrids of three full-sib progenies of Panicum maximum were evaluated.

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The individuals were obtained by crossing four parents, the sexual mother plants S10 and S12, with the apomictic cultivars Mombaça and Tanzania, which were pollen donors. Progeny 1 resulted from the cross between the sexual plant S10 and guinea grass cv. Tanzânia, progeny 2 resulted from the cross between the same sexual plant with guinea grass cv. Mombaça and progeny 3 from the cross between the progenitor S12 and guinea grass cv. Tanzânia. After establishment, there were 114 hybrids from progeny 1, 167 hybrids from progeny 2 and 45 from progeny 3. The 326 individuals were cloned by clump division and planted in a clonal test.

An incomplete block design was used with two replications and a total of 33 blocks. Each block consisted of three rows or plots with nine plants per row. Each row corresponded to one of the above progenies. At the border guinea grass cv. Mombaça plants were used. Spacing was one meter between plants within the row and between rows.

The hybrids were managed through harvests at a height of 25 cm from the ground level performed on January 26th, March 8th, June 5th, October 10th, November 18th, December 29th, 2010 and February 3rd, 2011. The harvest done on June 5th was not used in the analysis because it occurred right after flowering of the hybrids, where seeds were also harvested for future studies. In each harvest, forage was harvested, weighed and a sample taken. The samples were separated into the morphological components: leaf blades, stems and sheaths and dead forage. The leaf blade samples had your nutritive value characteristics determined by the near infrared spectroscopy technique (NIRS). The traits evaluated were: organic matter (OM), crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), lignin, cellulose, biogenic silica and *in vitro* organic matter digestibility (IVOMD).

The linear mixed model below was use to estimate the genotypic value of the hybrids:

$$y = Xm + Zg + Wp + Tb + Qs + e$$

in which y is the data vector, m is the vector of the effects of combinations replication-measurement (assumed to be fixed) added to the overall mean, g is the vector of genotypic effects of individual (assumed to be random), p is the vector of plots effects (assumed to be random), b is the vector of blocks effects (assumed to be random), s is the vector of permanent environmental effects (random) e is the vector of errors or residues (random). The capital letters represent matrices of incidence for these effects.

With the genotypic value of the hybrids, an average was calculated for each progeny and the means were compered by t-test, adopting 1% as a critical level for Type I error. All analyzes were performed using Statistical System and Computerized Genetic Selection via Linear Mixed Models, Selegen - REML/BLUP (RESENDE, 2007).

RESULTS AND DISCUSSION: Were observed significant differences between all characteristics in all progenies evaluated. To crude protein (CP), were noted higher level for progeny 1 and 3 (Table 1). Probably, this higher CP contente is due to the participation of guinea grass cv. Tanzânia in the crossbreeding. Acording to Jank (1995) and Quadros e Rodrigues (2006) there are differences in nutritive value of the cultivars Tanzânia and Mombaça, with digestibility and chemical composition to cv. Tanzânia.

The neutral detergent fiber content (NDF) was higher in the progeny 2, followed by progeny 1(Table 1). The progeny 3 showed the lowest NDF value, which can be a result of the crossbreeding between the sexual plant S12 and the cultivar Tanzânia.

Despite the little differences, significant differences also were observed between all progenies to acid detergent fiber (ADF) and the higher value was observed to progeny 2. Acording to Jank (1995), the cultivar Mombaça stands out your high forage yield among the *Panicum maximum* cultivars, but the increase in production is usually associated to low forage quality.

The in vitro organic matter digestibility (IVOMD) also differed statistically between all progenies and was minimized by the inclusion of cultivar Mombaça and maximized by the combination between S12 and cultivar Tanzânia.

To lignin, only progeny 2 differed statistically to the others, showing the highest content to the chemical component (Table 1).

The cellulose content did not differed between the progenies 1 and 2 and was statistically lower in the progeny 3, suggesting the combination between S12 and cultivar Tanzânia had contributed more effectively to improve the forage quality in the crossbreeding.

Table 1. Means for nutritive value characteristics in *Panicum maximum* hybrid progenies

Characteristic (%)	Means of the progenies				Standard deviation	LSD (5%)
	1	2	3	Overall		
Crude protein	13,47[a]	13,07[b]	13,66[a]	13,40	0,1075	0,2107
NDF[1]	73,07[b]	73,71[a]	71,94[c]	72,91	0,1684	0,3301
ADF[2]	38,63[b]	39,27[a]	38,26[c]	38,72	0,1330	0,2606
IVOMD[3]	61,33[b]	59,60[c]	62,28[a]	61,07	0,2874	0,5632
Lignin	2,97[b]	3,14[a]	2,96[b]	3,02	0,0229	0,0449
Cellulose	28,21[a]	28,36[a]	27,68[b]	28,08	0,0895	0,1754

LSD = Least significant difference; [1] neutral detergent fiber; [2] acid detergent fiber; [3] in vitro organic matter digestibility;

CONCLUSION: The hybrid progenies of *Panicum maximum* are different in nutritive value, so that the sexual plant S12 and the cultivar Tanzânia provide increases crude protein and digestibility and reduction of the fiber content. On the other hand the crossbreeding with cultivar Mombaça causes little reduction in nutritive value of the progeny. Thus, it is suggested that the inclusion of cultivar Tanzânia and the sexual plant S12 have high potential to contribute positively with the nutritive value in the *Panicum maximum* breeding.

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