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22nd International Grassland Congress

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The 22nd International Grassland Congress (Revitalising Grasslands to Sustain Our Communities) took place in Sydney, Australia from September 15 through September 19, 2013.

Proceedings Editors: David L. Michalk, Geoffrey D. Millar, Warwick B. Badgery, and Kim M.

Broadfoot

Publisher: New South Wales Department of Primary Industry, Kite St., Orange New South Wales, Australia

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**Presenter Information**

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# Morphogenic responses of two *Brachiaria* genotypes in response to clipping frequency

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**Keywords:** Marandu palisadegrass, Mulato II brachiariagrass, defoliation, leaf appearance, pasture.

## Introduction

Tropical grasslands represent an important resource for the Brazilian cattle industry, which is heavily dependent on grazed pastures. Total pasture area in the country totals 196 M ha (23% of the country's land area) (FAO 2013). The genus *Brachiaria* represents around 85% of cultivated pastures in Brazil (Moreira *et al.* 2009), 40% of which are established with *B. brizantha* cv. Marandu (Barbosa 2006). Mulato II is a new hybrid brachiaria grass cultivar which has been developed to improve agronomic characteristics, broaden the range of adaptation, and to ensure high forage production and nutritive value. It has also been viewed as a means of reducing the dependence on the Marandu palisade grass monoculture (Argel *et al.* 2007). The use of new cultivars should be based on adequate understanding of physiological processes and growth potential under a range of management practices. Morphogenic characteristics allow for accessing herbage accumulation potential through the measurement of tissue synthesis and senescence in forage plants. Management practices such as defoliation frequency can modify assimilate partitioning in the forage plant, affecting morphogenic characteristics related to growth rate and forage nutritive value.

The objective of this research was to describe and explain morphogenic differences between Marandu palisade grass and Mulato II brachiaria grass as affected by harvest frequency.

## Methods

The experiment was conducted in the Department of Animal Science ESALQ/USP, Piracicaba, SP, Brazil (22°42' S, 47°30' W; 580 m asl). Average annual rainfall is about 1,300 mm and temperature ranges between 10°C and 35°C. The soil at the experimental area is a Kandiualfic Eutradox. Plots were established with *Brachiaria brizantha* cv. Marandu and *Brachiaria* cv. Mulato II in October 2010. The evaluation occurred during the summer season (December 22, 2011–March 20, 2012). Two experiments were conducted simultaneously in adjacent areas, one irrigated and another non-irrigated. The design of each experiment was a randomised complete block in a 2 x 2

factorial arrangement, with the 2 grasses and 2 harvest frequencies (28 and 42 days) and 4 replications, totalling 16 experimental units of 20 m<sup>2</sup> (4 m x 5 m). Harvests were made 10 cm from the soil surface. Ten tillers were evaluated for the following characteristics: (1) leaf blade length; and (2) leaf type, classified as expanding, expanded, senescing and dead. Leaves were classified as expanding when their ligules were not exposed; expanded when the ligule was visible and/or growth ceased; senescing when part of leaf blades showed signs of senescence (yellowing and necrosis); and dead, when more than 50% of the leaf blade was senesced. Degree of leaf senescence was estimated visually. The stem length was measured from the soil level to the ligule of the youngest fully expanded leaf. Means were calculated using “LSMEANS” statement, and comparisons made with “PDIFF” based on a Student t-test (P<0.05). Data for the experiment were analysed using the GLM Procedure of SAS.

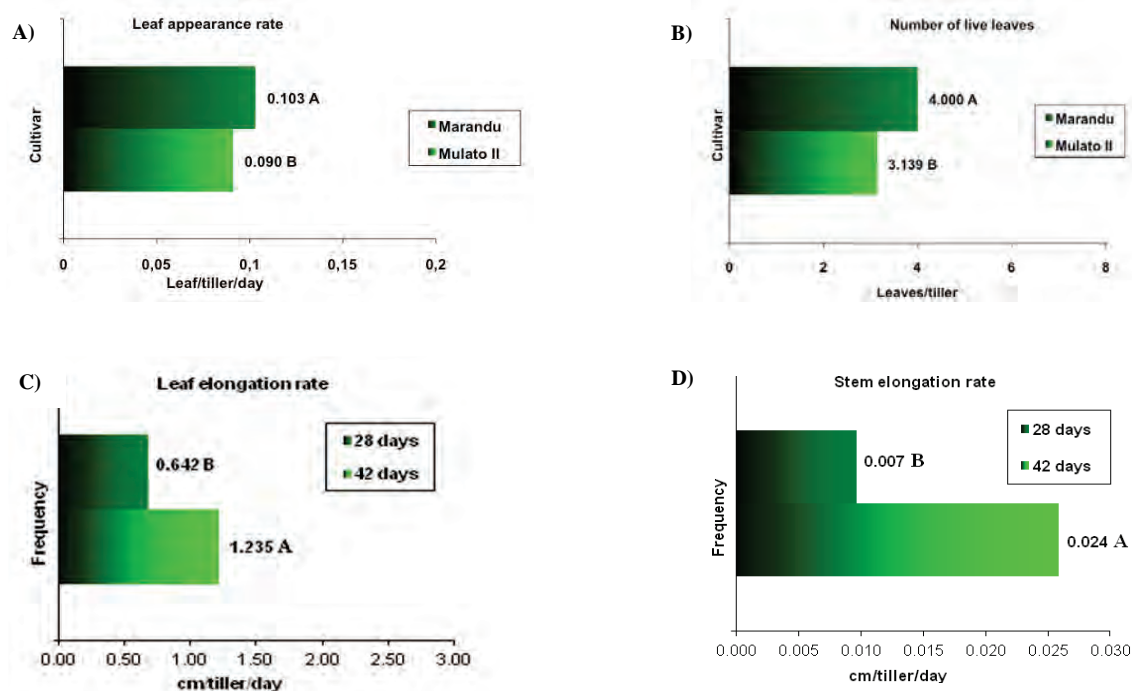
## Results

Marandu palisade grass had higher leaf appearance rate than Mulato II (Fig. 1A). This was due to the higher number of leaves per tiller in Marandu (Fig. 1B) and the similar length of leaves in the 2 grasses (8.8 cm, P=0.7789). Leaf elongation rate increased from 0.64 to 1.24 cm/tiller/d with lower harvest frequency (Fig. 1C). This characteristic is related to an increase in leaf area resulting in an exponential increase of shoot mass in swards clipped every 42 days relative to those clipped every 28 days. The 42-d clipping frequency resulted in a 3-fold stem elongation rate compared with the 28-d frequency (Fig. 1D). The stem component is often related to decreased nutritive value and intake by grazing ruminants.

Despite the higher stem elongation rate, which is often associated with light competition among tillers, senescence rate was not affected by clipping frequency (0.0055 cm/tiller/d, P=0.0723). Light competition among tillers was not sufficient to cause accelerated death of mature leaves in the base of the sward.

## Conclusion

The higher morphogenic rates and growth potential of



**Figure 1.** Morphogenic characteristics of 2 *Brachiaria* genotypes in response to clipping frequency.

Marandu palisade grass than Mulato II may help explain the different growth responses in these genotypes. Harvesting every 28 days would reduce stem proportion in the herbage mass harvested, resulting in better quality forage for animals, but with lower production than expected.

### Acknowledgments

Thanks are due to Fundação de Amparo à Pesquisa do Estado de São Paulo, Brazil (FAPESP) for granting graduate scholarships to A.F.G.Faria, D.N.L.Pequeno, L.S.Silva and A.S.Ferreira.

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