# Accumulation of Dry Matter and Morphological Composition of Irrigated Mombaça Grass Fertilized with and without Nitrogen under Grazing

Ulysses Cecato
*Universidade Estadual de Maringá, Brazil*

Gracielle C. Mari
*Universidade Estadual de Maringá, Brazil*

Tatiane Beloni
*Universidade Estadual de Maringá, Brazil*

Vanessa C. Piotto
*Universidade Estadual de Maringá, Brazil*

Túlio Otavio D'Almeida Lins
*Universidade Estadual de Maringá, Brazil*

*See next page for additional authors*



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## Presenter Information

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*Ulysses Cecato [A], Gracielle C Mari [B], Tatiane Beloni [B], Vanessa C Piotto [B], Túlio Otavio D`Almeida Lins [A] and Alyson Andrade Pinehiro [C]*

[A] Professor, Department of Animal Science, Universidade Estadual de Maringá (UEM), Maringa, PR, Brazil, Sponsored by CNPq.
[B] Master's Program at the Graduate in Animal Science - UEM, Maringa, PR, Brazil
[C] Doctor's Program at the Graduate in Animal Science - UEM, Maringa, PR, Brazil

Contact email: ucecato@uem.br

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## Introduction

Brazil is the holder of the largest commercial cattle herd in the world and the world's leading exporter of fresh and industrialized meat. Beef production is based on pastures and the production system is influenced by absence of fertilization and the seasonality of forage during of this the year, caused mainly by temperature, rainfall and luminosity. Nitrogen (N) is the most important element for the development and growth of grasses, since it accelerates the formation and growth of new leaves, improves regrowth vigor resulting in greater production and carrying capacity of pastures (Cecato *et al*. 2011). The present study aimed to evaluate the accumulation of dry matter and percentage of leaf blade of irrigated Mombaça grass (Panicum maximum Jacq. cv. Mombaça) with four N fertilizer doses, under intermittent grazing.

## Methods

The work was conducted in the northwest of Paraná, Brazil, at the geographical location 22° 50'16 "S latitude and 51° 58'22" of longitude, with an altitude of 410 m asl. The soil was classified as Oxisol sandy texture (Embrapa, 2009). An experimental design with blocks of Mombaça grass (*Panicum maximum* Jacq. *cv*. Mombaça) in split plots with four replications was used. Four doses of N were imposed as treatment: 0 (control), 200, 400 and 800 kg of N/ha/yr. The application of the doses of nitrogen was applied after grazing and split according to the number of grazing per treatment, and with four, seven, nine and ten grazing cycles periods, respectively, for 0, 200, 400 and 800 kg of N/ha/yr. The pasture was irrigated with 80 mm for month. For grazing, a rotational stocking method was used, with the entry of the animals when the pasture reached 95% light interception and removed when the pasture's residue was 40 cm height. Crossbred dairy cows were used for defoliation. For the determination of dry matter production six samples per paddock, with one square meter each, were cut to ground level in the pre-grazing. The harvested forage was dried and herbage accumulation calculated by subtracting the dry matter available before and after grazing. The percentage of leaf blade was determined by the separation of the morphological components into leaf, stem and dead material. Results were expressed on a seasonal basis (spring, summer, autumn and winter). The data were analyzed by statistical analysis system (SAS, 2002).

## Results and Discussion

There was an interaction between the treatments and seasons for the characteristics evaluated (Table 1). The

**Table 1. Accumulation of dry matter and the percentage of leaf blade of irrigated Mombaça grass and fertilized or not with nitrogen doses grazing, in the seasons of year. The mean ± one standard deviation is shown**

| Season | Nitrogen (kg of N/ha/yr ) | | | | Mean |
|---|---|---|---|---|---|
| | 0 | 200 | 400 | 800 | |
| | Accumulation of dry matter (t DM/ha) | | | | |
| Spring | 2.89 ± 0.22 Db | 6.53 ± 0.29 Cb | 10.17 ± 0.18 Bb | 17.45 ± 0.59 Ab | 9.25 ± 5.60 |
| Summer | 4.23 ± 0.26 Da | 8.11 ± 0.23 Ca | 11.99 ± 0.17 Ba | 19.75 ± 0.48 Aa | 11.05 ± 5.98 |
| Autumn | 2.51 ± 0.48 Cb | 4.45 ± 0.32 Bc | 6.46 ± 0.30 Ac | 6.79 ± 0.80 Ac | 5.05 ± 1.62 |
| Winter | 1.58 ± 0.35 Db | 2.51 ± 0.14 Cd | 3.52 ± 0.25 Bd | 5.11 ± 0.81 Ad | 3.21 ± 1.42 |
| | Percentage of leaf blade (%) | | | | |
| Spring | 65.23 ± 0.55 Ca[1] | 76.03 ± 1.79 Aa | 73.51 ± 2.40 Ba | 72.40 ± 0.88 Bb | 71.88 ± 4.41 |
| Summer | 60.51 ± 1.97 Ca | 71.94 ± 1.10 Ba | 75.45 ± 2.96 Aa | 76.38 ± 2.33Aa | 71.07 ± 6.81 |
| Autumn | 63.32 ± 3.26 Ba | 74.17 ± 2.46 Aa | 73.34 ± 2.69 Aa | 73.32 ± 1.26Ab | 71.54 ± 5.51 |
| Winter | 48.79 ± 4.23 Bb | 66.51 ± 1.22 Ab | 66.76 ± 2.73 Ab | 71.25 ± 1.51Ab | 63.30 ± 9.16 |

Values followed by the same letters do not differ by Turkey's test ($P$<0.05), upper-case letters compare nitrogen rates within seasons, while lower case letters compare seasons at the same nitrogen rate.

total accumulation of dry matter (TADM) in summer season was higher than the spring at all four N rates applied, and the lowest TADM occurred during the winter. For the autumn, the TADM was intermediate between the other seasons, having the highest TADM values in the two highest nitrogen rates. Within each season the zero nitrogen rates showed the lowest values. Regarding the productive response of N use in pastures, some studies report that grasses respond linearly to the rate applied for the production of dry matter (Fagundes 2006; Moreira 2005). Working with irrigated Mombaça grass and four doses of N (70, 140, 210 and 280 kg of N/ha/yr), Freitas (2005) reported the highest dry matter yield at the highest doses of nitrogen and also a linear response between these N doses.

In plants fertilized with N the average Lf % (percentage of leaf blade) was higher in all seasons compared to the unfertilized plants. However the Lf % was higher in summer, spring and fall, independently of N fertilization, except at the dose of 800 kg of N/ha in the spring and autumn. The lowest Lf % occurred in non-fertilized plants, independently of the season, and in the winter independently of the dose of N. This result shows the importance of using N at times with appropriate weather conditions to influence the number of leaves and the rate of elongation, and consequently the production of pasture dry matter (Cecato *et al.* 2011).

## Conclusions

The dry matter and percentage of leaf blade of Mombaça grass both responded positively to increasing nitrogen fertilizer application, especially when the weather conditions were appropriate.

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