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Performance of young Nellore bulls grazing marandu grass pasture at different heights

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Introduction
Brazil is one of the largest beef cattle producers in the world with approximately 200 M head. The Industry relies predominantly on warm-season grass pastures, with approximately 90% of animals finished on pastures.

One of the main factors for the intensification of animal production systems based on pasture is appropriate management. Adjustment of stocking rate to maintain optimum forage allowance is essential. Studies on forage allowance have resulted in a better understanding of the response of forage crops and animals to changes in grazing intensity.

The purpose of this study was to evaluate management strategies for beef cattle systems grazed at different heights (15, 25 and 35 cm) in Brachiaria brizantha cv. Marandu in terms of pasture production and animal performance.

Material and Methods
The experiment was conducted at Animal Science Department, Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil (21°15’22”S; 48°18’58”W; 595 m asl). The trial was set up in an area of Brachiaria brizantha cv. Marandu pastures established in 2001 on a red latosol. Fertiliser was applied at the rate of 90 kg N/ha in the rainy season. According to the Köppen classification, the climate of Jaboticabal is characterised as Awa, or subtropical with dry winters and rainy summers. The experimental period was from January to April 2012 during the rainy season. Experimental paddocks (6.0 ha) were managed under continuous stocking, with variable stocking rates to give 3 grazing heights (15, 25 and 35 cm) using young Nellore bulls.

Forage quantitative and structural components were measured monthly using samples collected from the sites at medium height and separated into leaf blades, stems and leaf sheaths, and dead matter. All forage included within the perimeter of the rising plate (0.25 m²) was collected at the soil level. Individual animal performance was measured by weighing animals at the start and end of the experiment, after a 12-hour period of complete fasting.

Data were analysed by a complete randomised design with 3 grazing heights (15, 25 and 35 cm) and 2 replications (paddocks) with 6 animals per paddock, and period in repeated measures over time. Data were analysed using the GLM procedure of SAS.

Results and Discussion
Total herbage mass and leaf and stem proportions decreased, and dead material increased along the experimental period (Table 1). Herbage mass increased in response to grazing height, while structural characteristics such as leaf mass and stem mass decreased. The dead mass increased along the experimental period.

Table 1. Total herbage mass and mass of the components in Brachiaria brizantha cv. Marandu pastures managed at 3 forage heights under a continuous stocking system during the rainy season. Means followed by the same lower-case letters in rows and upper-case letters in columns for each analysed factor were not significantly different according to Tukey’s test at 10% probability. Experimental periods: 1st: 01/27/2012; 2nd: 02/25/2012; 3rd: 03/23/2012; 4th: 04/21/2012.

| Variable          | Height (cm) | 1st period | 2nd period | 3rd period | 4th period |
|-------------------|-------------|------------|------------|------------|------------|
| Forage mass (kg/ha) | 15          | 6542 Ca    | 4934 Cb    | 3524 Cc    | 2114 Cd    |
|                   | 25          | 8297 Ba    | 8646 Ba    | 7208 Bb    | 5770 Bc    |
|                   | 35          | 13512 Aa   | 11614 Ab   | 10058 Ac   | 8502 Ad    |
| Leaf mass (%)     | 15          | 38.7 Ba    | 33.9 Ab    | 24.9 Ac    | 16.0 Ad    |
|                   | 25          | 44.5 Aa    | 31.1 Ab    | 25.0 Ac    | 18.9 Ad    |
|                   | 35          | 37.4 Ba    | 34.3 Ab    | 26.0 Ac    | 17.7 Ad    |
| Stem mass (%)     | 15          | 28.5 Ab    | 31.9 Aa    | 27.6 Bb    | 23.2 Cc    |
|                   | 25          | 28.2 Ab    | 33.3 Aa    | 30.6 Ab    | 27.9 Bc    |
|                   | 35          | 26.3 Ab    | 32.3 Aa    | 31.4 Aa    | 30.6 Aa    |
| Dead mass (%)     | 15          | 32.7 Bd    | 34.1 Ab    | 47.4 Bc    | 60.7 Aa    |
|                   | 25          | 27.2 Cd    | 35.5 Ab    | 44.3 Ac    | 53.0 Ba    |
|                   | 35          | 36.2 Ac    | 33.3 Ad    | 42.4 Ab    | 51.6 Ba    |

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Table 2. Initial and final weights and performance of young Nellore bulls grazing Brachiaria brizantha cv. Marandu pastures at 3 different heights during the rainy season. Means followed by the same lower-case letter within columns for each analysed factor were not significantly different according to Tukey’s test at 10% probability.

| Height (cm) | IW (kg) | FW (kg) | ADG (kg/d) | AG (kg/ha/d) |
|------------|---------|---------|------------|--------------|
| 15         | 243.0 a | 279.2 c | 0.3 b      | 2.5 c        |
| 25         | 242.6 a | 314.9 b | 0.6 a      | 3.6 a        |
| 35         | 245.9 a | 330.0 a | 0.7 a      | 3.2 b        |

did not respond uniformly to grazing height.

With the decline in both rainfall and temperatures in March-April in Brazil, tropical grasses begin to senesce, resulting in a higher proportion of stem and dead material, with the effect most obvious in swards managed at greater heights. In general, crude protein and digestibility values decreased, while cell wall increased over the experimental period.

Animal ADG increased in response to pasture height (Table 2), mainly related to higher herbage allowance in this pasture. According to Poppi and MacLennan (2007), average daily weight gain from tropical pastures during the wet season ranges from 0.5 to 0.7 kg/d depending on herbage allowance. Our observations at the greater herbage heights conform with this suggestion.

Conclusion

While increasing herbage grazing height increased animal weight gains, there was a plateauing effect between 25 and 35 cm. The increased grazing pressure to maintain pastures at the lower height more than compensated for the slightly higher daily gains at the higher grazing height. Grazing intensity should be manipulated to obtain a compromise between gains per individual and gains per hectare.

Acknowledgments

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