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Nutritive value and biomass production of *Brachiaria humidicola* hybrids with divergent biological nitrification inhibition activity

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INTRODUCTION

Tropical land areas utilized for feed production are under continuous pressure to provide sufficient feed in terms of biomass and nutrient quality. Also, some *Brachiaria humidicola* (Bh) genotypes have been identified with high Biological Nitrification Inhibition (BNI) activity. The BNI trait may reduce the rate of transformation of ammonia into nitrate in soils and could contribute to mitigation of climate change by avoiding the formation of nitrate and later moderating nitrous oxide emission during denitrification.

OBJECTIVE

Aim of this work was to investigate the relationship between the nutritive value - biomass production and the biological nitrification inhibition (BNI) activity in *Brachiaria humidicola* (bh) hybrids.

METHODS

Twelve intraspecific hybrids of Bh08 with contrasting BNI activity were classified into:

- 1) Bh1149, Bh0700, Bh1155: High activity (0.58-0.96 mg NO₃ kg⁻¹ soil day⁻¹)
 - 2) Bh696, Bh422, Bh0022, Bh1248: Intermediate activity (1.27–1.62 mg NO₃ kg⁻¹ soil day⁻¹)
 - 3) Bh1243, Bh450, Bh0675, Bh0680, Bh1250: Low activity (1.84–2.49 mg NO₃ kg⁻¹ soil day⁻¹)
- Five Bh genotypes (CIAT 679, CIAT 26146, CIAT 26149, CIAT 26159, CIAT 16888) were employed as controls.
 - Seventeen plots (4x4m²) with three replications were used to allocate the experimental units.
 - Rising-plate-meter was used to measure the compressed sward height at 0, 7, 14, 21, and 28 days after height homogenisation.
 - Biomass was collected at two points below the disc of the rising-plate-meter to ground level after CSH measurement.
 - Near infrared spectroscopy (Foss 6500) was used to calculate crude protein (CP), neutral detergent fiber (NDF), NDF digestibility (NDFd), acid detergent fiber (ADF), and *in-vitro* dry matter digestibility (IVDMD).
 - The randomised complete block design was employed for data analysis (SPSS-v20).



Figure 1. View of *B. humidicola* hybrids with contrasting Biological Nitrification Inhibition (BNI) activity at Colombia's Piedmont

RESULTS

No differences among the BNI groupings were observed for CP, NDF, ADF, NDFd, or IVDMD.

Bh hybrids with intermediate BNI activity had the largest biomass production (3208 kg DM ha⁻¹) and which differed from that of the hybrids with either high or low BNI activity (2916 or 2800 kg DM ha⁻¹, respectively).

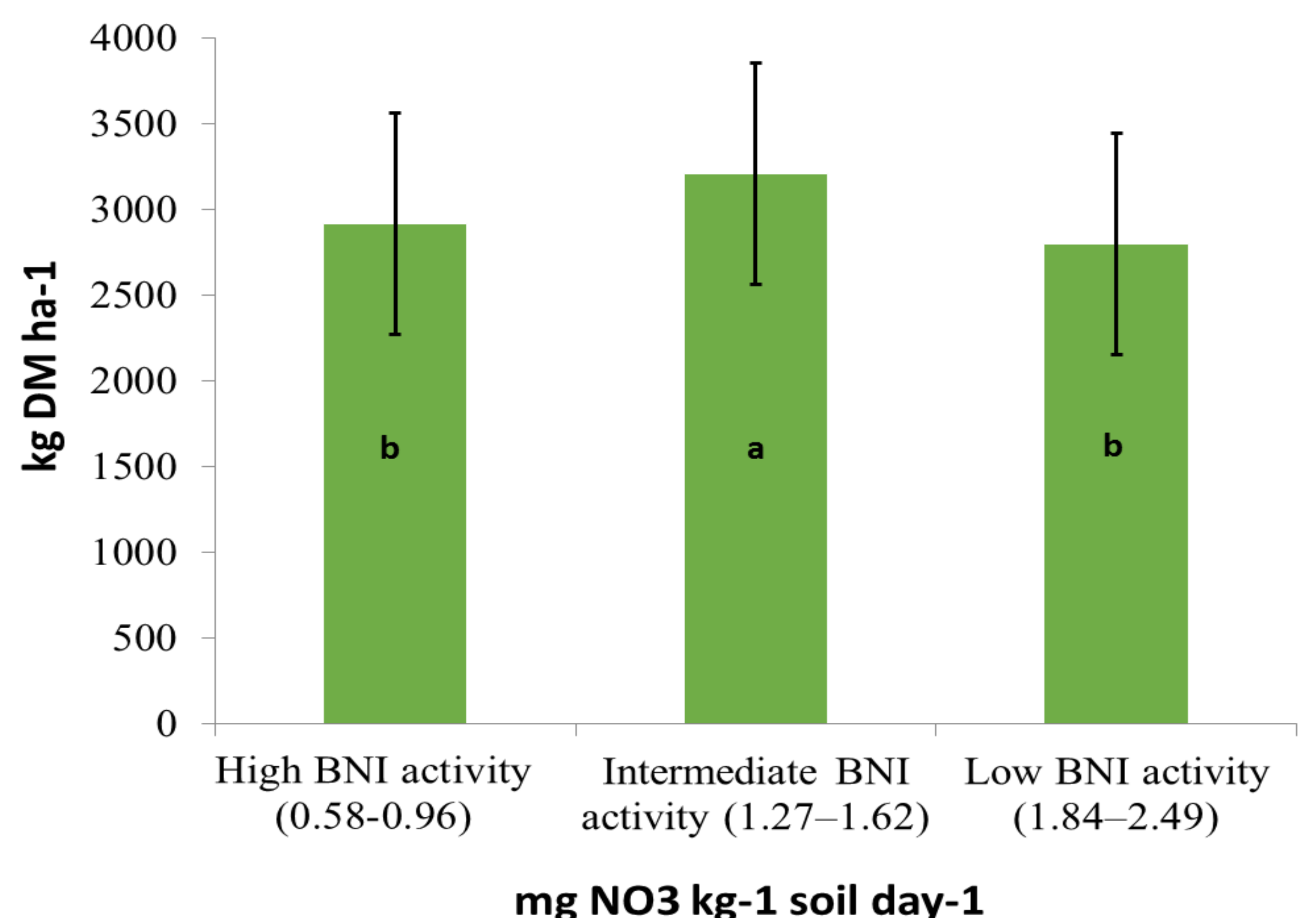


Figure 2. Biomass production of *B. humidicola* hybrids with contrasting Biological Nitrification Inhibition (BNI) activity

CONCLUSIONS

No differences among the BNI groupings were observed for CP, NDF, ADF, NDFd, or IVDMD. Bh hybrids with intermediate BNI activity had the largest biomass production. Further evaluations across seasons, years, and locations, are recommended to confirm and extend these findings.