Secondary production in *Pennisetum glaucum:* effect of Nitrogen fertilizer

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Nitrogen (N) is a critical nutrient in food production systems, frequently limiting the productivity of both pastures and grain crops. Different sources of nitrogen can modify their efficiency, thereby impacting the productive potential of forage and subsequent animal performance. This study aims to evaluate the effects of different N sources on the secondary productivity of pearl millet (*Pennisetum glaucum*) pastures grazed by cattle (*Bos taurus*). The study was carried out at the Agronomic Experimental Station of the Federal University of Rio Grande do Sul – EEA/UFRGS, in Eldorado do Sul/RS - BR. The period studied covered the grazing cycles of 2022 (January – April) and 2023 (January – March). The experiment included four N sources: T1 - control, T2 - ammonium nitrate (NH_4NO_3), T3 - urea and T4 - ammonium nitrate + 5%Ca + 3,7%S (NH_4NO_3+), each applied at a rate of 100 kg of N ha^{-1}. The experimental design was randomized blocks with 3 replications. The experimental units comprised 12 paddocks averaging 1.5 ha each, where sward height was measured at 150 points using a sward stick to maintain targeted height of 40 cm, following the 'Rotatinuous" grazing concept (i.e., minimizing grazing time per unit dry matter ingested). Brangus steers were continuously stocked with a variable stocking rate. At the beginning and end of each grazing cycle, the animals were weighed to determine their average daily gain (ADG - kg LW). The stocking rate (SR- kg LW ha^{-1}) was computed by adding the average LW of tester animals and the LW of put-and-take animals multiplied by the respective number of days they were in the paddocks, and then dividing by the area of the paddock. The live weight gain per area (LWGA - kg LW ha^{-1}) was calculated using the ADG of tester animals and the SR. The data were analyzed using ANOVA, and the means were compared by the Tukey test, both using SAS® Studio version at significance level of 5%. Treatments T2, T3, and T4 showed significant differences in SR (1,559, 1,355, and 1,393 kg LW ha^{-1}, respectively) and LWGA (277, 275, and 308 kg LW ha^{-1}, respectively) compared to control (T1) (SR= 907 kg of LW ha^{-1} and LWGA = 181 kg LW ha^{-1}). T2 presented a SR 72% higher than the control, while T4 demonstrated a 70% superiority in LWGA compared to T1. The application of nitrogen fertilization resulted in increased LWGA and SR, regardless of the nitrogen source. These findings underscore the significance of nitrogen fertilization in pasture management, as it enhances the efficiency of secondary production.

Keywords: Plant nutrition; animal production; grazing management; nitrogen.

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