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Rumen protozoa of Nellore cattle in different pasture production systems

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The rumen hosts a complex microbial population, including ciliated protozoa, responsible for fiber digestion, microbial protein synthesis, ruminal fermentation, and balance of the ruminal ecosystem. Additionally, they contribute to the production of short-chain fatty acids (SCFA), which directly influence the productive performance of ruminants. The ability to digest most food components is crucial for ciliates engaged in ruminal fermentation, contributing significantly to up to 34% of fiber digestibility in this process. This study aimed to evaluate the concentration and composition of the population of ciliated protozoa in the rumen of cattle in different pasture production systems. Nine rumen-cannulated Nellore bulls were randomly distributed into three treatments with three grazing replicates each, in a completely randomized design, totaling nine grazing units: i) degraded pasture of *Urochloa* spp. (DEG); ii) pasture of *Urochloa* spp. fertilized with 200 kg of N-urea ha^{-1} $year^{-1}$ (REC); and iii) a mixture of legume-grass pasture composed of *Urochloa* spp. and *Cajanus cajan* cv. BRS Mandarin (MIX). Samples were collected over two years (2020-2021) during the dry (June) and rainy (January) seasons. Rumen content (solid and liquid) was manually collected via a rumen cannula, and 10 mL of this material was stored in bottles containing 20 mL of 18.5% (v/v) formaldehyde. Subsequently, samples were stained with 2% brilliant green, diluted, and the main ciliated protozoan groups in the rumen–subfamily *Diplodiniinae*, genus *Entodinium*, and Holotricha population (genera *Isotricha* and *Dasytricha)*–were identified, classified, and counted under optical microscopy using a Sedgewick Rafter chamber (1 mL capacity). Data were submitted to analysis of variance (PROC MIXED), and means were compared by the Fisher test at 5%. The average populations ($x10^3$/mL) of *Diplodiniinae* were 20.0, 31.3, and 29.3; *Entodinium* 235.5, 229.4, and 249.3; *Isotricha* 10.7, 14.8, and 13.0; and *Dasytricha* 31.2^{B}, 49.0^{A}, and 41.6^{AB}, for MIX, REC, and DEG, respectively. Only *Dasytricha* population showed significant differences between treatments (P = 0.0099). Although Holotricha may appear in higher numbers in grazing ruminants, the presence of condensed tannins (CT) from the MIX treatment may have reduced the count of Holotricha, particularly *Dasytricha* spp., known for its greater sensitivity about the subfamily *Entodiniinae*, which is more representative in the rumen ecosystem. Concentrations of Holotricha may vary based on diet composition and quality. Moreover, these variations in protozoan populations can directly impact enteric methane emissions.

Keywords: consortium; *Dasytricha*; grass; legume; pigeon pea; tannins

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