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Feed Conversion Ratio of *Nellore* beef steers in extensively, intensively managed pastures and silvopastoral systems in Southeast of Brazil

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This study evaluated the effects of intensification and integration in animal production systems on the feed conversion ratio (FCR) of beef cattle. The experiment was carried out from September 2019 to September 2020 at Embrapa Southeast Livestock, São Carlos, SP. The systems included 30 *Nellore* steers with approximately 375 ± 30 kg and aged between 22 ± 1 months, randomly assigned to five treatments, with two replicates, as follow: 1) extensively managed degraded pasture (DP); 2) intensively managed silvopastoral system (LFS); 3) intensively managed rainfed pasture with a moderate stocking rate (RMS); 4) intensively managed rainfed pasture with a high stocking rate (RHS); and 5) intensively managed and irrigated pasture with a high stocking rate, overseeded in the "dry" season (IHS). Stocking rate adjustments were made using the "put and take" technique. Grazing was continuous in DP and rotational in LFS, RMS, RHS, and IHS with grazing cycles of 36 days. All pastures, except DP, received liming and corrective fertilization with P, K, S, and micronutrients. Pastures in LFS and RMS received 200 kg N ha^{-1} $year^{-1}$; while pastures in RHS and IHS were fertilized, respectively, with 400 and 600 kg N ha^{-1} $year^{-1}$. Total dry matter intake (DMI, kg) was estimated by the sum of pastures and mineral-protein supplements intake by the animals. Average daily gain (ADG, kg d^{-1}) was calculated based on animal's weighs obtained at the beginning of the experimental period (after 16 hours of fasting), and additionally, at regular intervals of approximately 28 days during the experiment until the end of the experimental period. The FCR (kg DMI kg^{-1} ADG) was determined according to the total number of days of the experimental period and to the four seasons of the year. Data were submitted to analysis of variance and comparison of means by the Fisher test at 5%, using the PROC MIXED of SAS. The annual FCR was lowest in RMS (11.7), intermediate in RHS (15.5), and highest in DP and LFS (25.2 and 23.4, respectively). Additionally, IHS (13.3) showed similar performance to RHS and RMS. Regarding the seasons, all systems presented similar values during the spring and summer (averaging 11.8 and 12.5, respectively); However, during autumn, RMS (12.0) presented the lowest FCR, followed by RHS (19.1), and by LFS (45.9), while DP (81.3) showed the highest value. IHS (16.0) was similar to RMS and RHS. In winter, the lowest FCR value was observed in RMS and IHS (11.8 and 10.8, respectively), followed by RHS (25.0), and higher in LFS and DP (37.9 and 35.7, respectively). In conclusion, systems with higher intensification, generally, had better annual FCR, although the best value occurred to intermediary treatment, RMS. The competition for natural resources in more complex systems, such as LFS, increases during the dry period and negatively influences the predicted benefits of the system, highlighting the importance of managing shading levels.

Keywords: animal performance, grazing systems, sustainability