

### Forage production in intensive and integrated grazing systems as a strategy to increase the sustainability of beef cattle livestock

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Livestock farming causes an environmental impact due to the emission of enteric methane gas. Adequate agricultural strategies are necessary to keep forage production at good levels and with better nutritional values, improving animal performance and reducing greenhouse gases emissions. This study aimed to evaluate the effects of intensification and integration of animal production systems on forage production. The experiment was conducted from September 2019 to February 2021 at Embrapa Southeast Livestock, in São Carlos, SP. The treatments with two replications were: 1) intensively managed and irrigated *Megathyrsus maximus* (syn. *Panicum maximum*) Jacques cv. Tanzânia, with high stocking rate (IHS); 2) intensively managed rainfed *Megathyrsus maximus* cv. Tanzânia, with high stocking rate (RHS); 3) rainfed pasture with a mix of *Urochloa* (syn. *Brachiaria*) *decumbens* Stapf cv. Basilisk and *Urochloa* (syn. *Brachiaria*) *brizantha* (Hochst ex A. Rich) Stapf cv. Marandu, with moderate stocking rate (RMS); 4) livestock-forestry system with *Urochloa decumbens* cv. Basilisk and with Brazilian native trees, with moderate stocking rate (LFS); and 5) degraded pasture of *Urochloa decumbens* cv. Basilisk (DP). All pastures were grazed by *Nellore* steers and submitted to stocking rate adjustments using the "put and take" technique, to maintain the specific stubble height for each forage species; under rotational stocking for IHS, RHS, RMS, and LFS; and in continuous stocking for DP; with grazing cycles of 36 days. Period of occupation was 3 days for IHS and RHS, and 6 days for RMS and LFS. The systems IHS and RHS were fertilized with 400 kg N ha<sup>-1</sup> year<sup>-1</sup>, and RMS and LFS with 200 kg ha<sup>-1</sup> year<sup>-1</sup>, applied during the rainy season, while the DP system was not fertilized. The IHS system was overseeded with *Avena byzantina* cv. São Carlos and *Lolium multiflorum* Lan. cv. BRS Ponteio and additionally fertilized with 200 kg N ha<sup>-1</sup> year<sup>-1</sup> during the dry season. The data of forage mass were submitted to analysis of variance and comparison of means by the Tukey test (5%), using the PROC MIXED of SAS. The IHS system, more intensified, presented the greatest forage mass, with 20,608 kg DM.ha<sup>-1</sup> year<sup>-1</sup>, similar only to the treatment with the same forage species (RHS) with 17,858 kg DM.ha<sup>-1</sup> year<sup>-1</sup>. Forage mass in RHS was not different to that in RMS and LFS (7,196 and 6,904 kg DM.ha<sup>-1</sup> year<sup>-1</sup>, respectively), with *Urochloa* pastures, but was higher to that in the DP treatment (2,988 kg DM.ha<sup>-1</sup> year<sup>-1</sup>). In conclusion, the higher of intensification, the better the result and the sustainability of production can be achieved if the planning and execution are adequate to the stipulated objective.

**Keywords:** forage production, grazing systems, sustainability, intensification

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