# Leaf area index and plant-part composition of grazed pastures in intensive and integrated beef cattle production systems

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Adequate agricultural practices are necessary to improve the sustainability of livestock and the intensification of production systems allows the control of plant and animal resources to achieve high efficiencies between animal production and forage quality and production. This study aimed to evaluate the effects of intensification and integration of livestock production systems on pasture morphogenic characteristics. The experiment was conducted from September 2019 to February 2021 at Embrapa Southeast Livestock, 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 $ha^{-1}$ $year^{-1}$, and RMS and LFS with 200 kg $ha^{-1}$ $year^{-1}$, 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 $ha^{-1}$ $year^{-1}$ during the dry season. Forage samples were collected for all treatments, at intervals of 18 days, at pre-grazing, in systems with rotational stocking, and inside isolation cages in the DP system. From these samples, a subsample was taken and separated in leaf, stem, and dead material fractions. Leaf area index (LAI) was determined using measurements from a leaf area meter (LI-COR ® model LI 3100). The data were submitted to analysis of variance and comparison of means by the Tukey test at 5%, using the PROC MIXED of SAS. The IHS treatment had higher LAI (4.9) than RMS (1.5) and DP (0.6). The IHS system presented greater leaf percentage (48%) than DP (23.8%) and RMS (21.2%), and lower dead material percentage (17.4%), than DP (46.7%). Stem percentage was not different between treatments. In general, the most intensified system (IHS) presented better morphogenic characteristics than the DP, which suggests that it can be an important strategy to improve forage production.

**Keywords**: leaf area index, plant-part composition, grazing systems, sustainability.