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# **Effects of the Integrated Crop-Livestock and Crop-Livestock-Forestry systems on forage growth, grazing behaviour, feed intake and performance of Nellore heifers during the dry season in Mato Grosso do Sul, Brazil**

## **Master Thesis**

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## Abstract

This study aimed at evaluating the effects of Integrated Crop-Livestock (ICL) and Integrated Crop-Livestock-Forestry (ICLF) systems on grazing behaviour, feed intake and performance of Nellore heifers by altering microclimate and forage morphological and productive characteristics in comparison to continuous pasture (CON) during the dry season. Data were collected in June and July 2019 in Embrapa Beef Cattle Research Corporation in Campo Grande, Brazil. The experimental site was divided into eleven paddocks. CON, sown with *Brachiaria decumbens*, was compared to ICL, sown with *Brachiaria brizantha* cv. BRS Piatã and ICLF with *Eucalyptus urograndis*, sown with *Brachiaria brizantha* cv. BRS Piatã in terms of morphological characteristics and nutritional value of forage. The RumiWatch system was used to assess the grazing behaviour of 36 Nellore heifers, while titanium dioxide (TiO<sub>2</sub>) marker method was used to evaluate the organic matter intake (OMI) of the heifers. The average daily gain (ADG) served as a measure to determine the livestock performance. The results revealed that ICL was characterized by the greatest forage biomass, while the forage biomass in ICLF was significantly reduced due to shading. Forage in ICLF presented enhanced nutritional quality in terms of crude protein (CP) and digestibility in comparison to ICL. ICL and ICLF provided heifers with a greater mass of green forage, while the forage in CON consisted mostly of dead plant material. The heifers in CON had a longer grazing time in comparison to ICL, whereas the OMI did not differ between the systems. The heifers achieved a greater ADG in ICL and ICLF, demonstrating that integrated systems have the potential to overcome the constraints of the dry season in Brazilian Cerrado.