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Drinking Water Intake of Beef Cattle in Pasture-Based Systems of Brazil

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Abstract

Beef cattle has a large water requirement per kg of liveweight (LW). Although water intake accounts for a minor proportion of this requirement, even small changes may impact on reducing this demand. Water intake (WI) of Nelore heifers was measured in three pasture-based systems with three paddocks per system: integrated crop-livestock-forestry (ICLF), integrated crop-livestock (ICL) and continuous pasture (CP) in Brazil. ICLF and ICL were a spatial-temporal integration of soybean and *Brachiaria brizantha*. For ICLF, there were *Eucalyptus urograndis* trees in array 22 × 4 m. In CP cattle were grazing *Brachiaria decumbens*. Heifers (n = 36) were randomly allocated to the systems, individually weighed at the beginning and at end of measurements (mean LW 317 ± 36.1 kg). Forage allowance (kg DM 100 kg⁻¹ LW) was 3.2 in ICLF, 7.1 in ICL and 4.4 in CP. Ambient air temperature, relative air humidity, precipitation, and radiation were measured in ICLF and CP by Tinytag dataloggers, rain gauges, and Accupar LP-80 Ceptometer, respectively, during rainy season from January to February 2019. Evaporation was calculated from class A pan. Drinking fountains were equipped with water meters that were read every day at 3 p. m. for 27 days, corrected for precipitation and evaporation. Data were grouped per system (n = 9), subjected to analysis of variance, means were compared by t-test. Total precipitation in 37 days was 346 mm. Temperature-humidity index (mean ± standard deviation) calculated was 77 ± 2.0 in ICLF, and 76 ± 1.6 in CP. Mean radiation (μmol m⁻² s⁻¹) was 789 ± 245 in ICLF, whereas 1518 ± 327 in CP. Daily WI (L 100 kg⁻¹ LW) was lower (p = 0.0135) in ICLF (3.58 ± 0.4) than in CP (5.55 ± 0.9), but similar in ICL (4.29 ± 0.8) compared to the other two systems (p > 0.05). Daily WI (L animal⁻¹) did not differ (p = 0.3141), it was 12.5 ± 1.6, 14.8 ± 2.6 and 14.6 ± 2.5 for ICLF, ICL and CP, respectively. Integrated systems reveal potential to decrease drinking water requirement. However, herbage intake should also be considered to explain the results.

Keywords: Agrosilvopastoral, beef cattle, daily water intake, grazing system