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Drinking water intake of beef cattle in pasture-based systems of Brazil

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Introduction

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.

Objective

Assess the water intake of Nellore heifers in three pasture-based systems: integrated crop-livestock-forestry, integrated crop-livestock and continuous pasture in Brazil

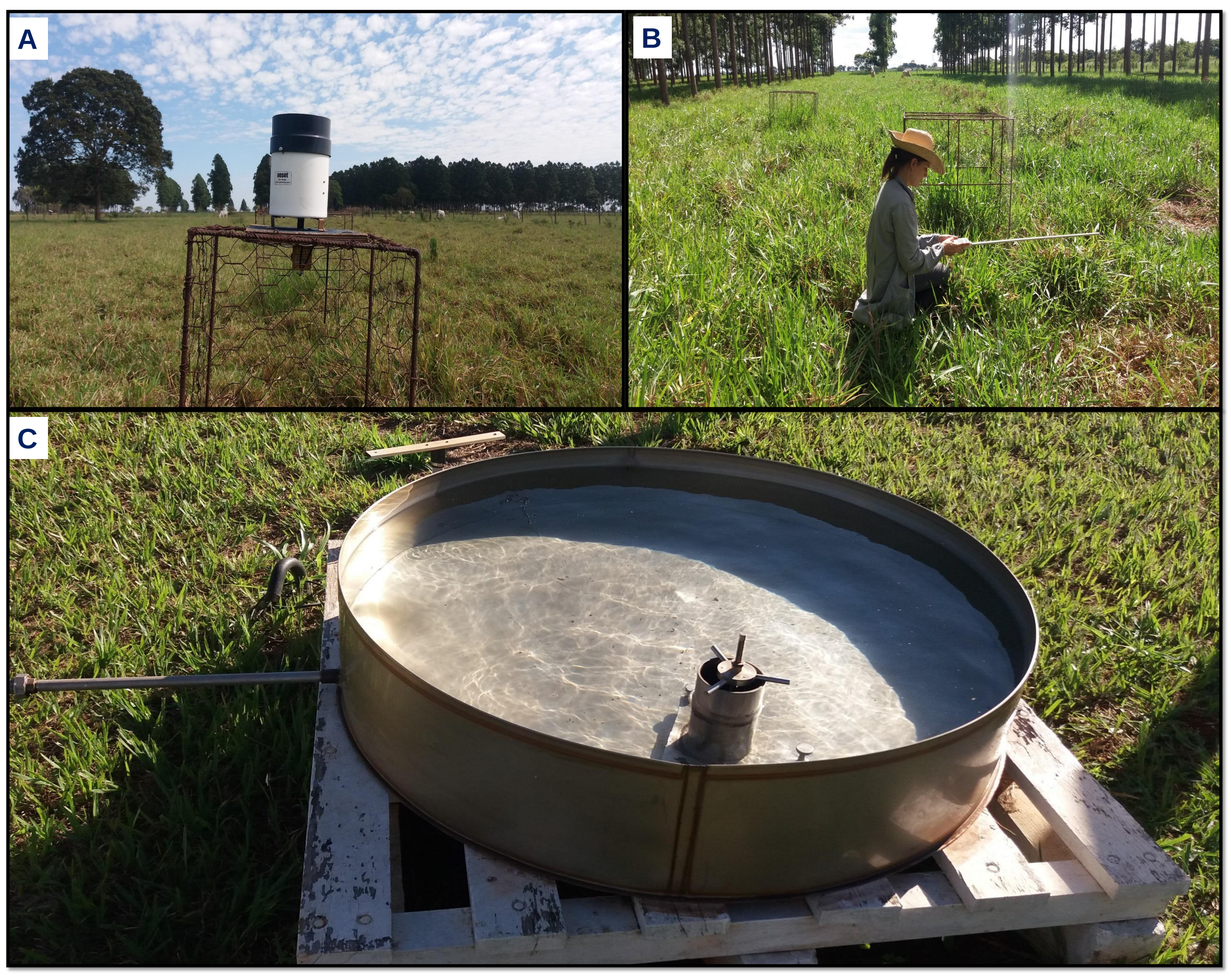
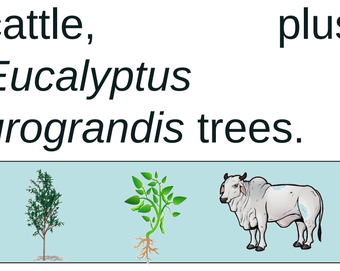


Figure 1. A. Climate datalogger and rain gauge placed in CP system. **B.** Radiation being measured in ICLF system. **C.** Class A pan used to calculate evaporation

Materials & Methods

Water intake (WI) of Nellore heifers was measured in three paddocks per system, during rainy season from January to February 2019:

Integrated crop-livestock-forestry (ICLF)	Integrated crop-livestock (ICL)	Continuous pasture (CP)
Soybean as a crop, *Brachiaria brizantha* and cattle, plus *Eucalyptus urograndis* trees.	Soybean as a crop, *Brachiaria brizantha* and cattle.	*Brachiaria decumbens* and cattle.



- Heifers (n = 36) were randomly allocated to the systems (mean LW 317 ± 36.1 kg).
- Forage allowance (kg DM kg-1 LW) was 3.2 in ICLF, 7.1 in ICL and 4.4 in CP.
- Climate parameters evaluated: Ambient air temperature, relative air humidity, precipitation, and radiation (Fig. 1. A and B). Total precipitation in 37 days was 346 mm.
- Evaporation was calculated from class A pan (Fig. 1. C).
- Drinking fountains were equipped with water meters that were read every day at 3 p.m. for 27 days, corrected for precipitation and evaporation.
- WI data were grouped per system (n = 9), subjected to analysis of variance, means were compared by t-test.

Results

- Temperature-humidity index (mean ± standard deviation) 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.

Table 1. Daily water intake (WI) of Nellore heifers in ICLF, ICL and CP systems

Variable	ICLF	ICL	CP	P - value
Daily WI (L 100 kg^{-1} LW)	3.58±0.4^{b}	4.29±0.8^{ab}	5.55±0.9^{a}	P = 0.0323
Daily WI (L $animal^{-1}$)	12.5±1.6^{a}	14.8±2.6^{a}	14.6±2.5^{a}	P = 0.3141

Means, ± standard deviation, followed by the same letter do not differ by t-test at 5% probability

Conclusions

Integrated systems reveal potential to decrease drinking water requirement. However, herbage intake should also be considered to explain the results.

Figure 4. Nellore heifers drinking water in CP system during the rainy season

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