Grazing Behaviour of Nellore Beef Cattle in Three Different Pastoral Systems in Western Paraná, Brazil

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Abstract

In Paraná state, Brazil, five Nellore beef cattle each were used to analyse their grazing behaviour in three grazing systems during April-June 2014:

1) an integrated crop-livestock system (ICLS) with soybean (*Glycine max*) as summer crop and signal grass (*Brachiaria brizantha*) as winter pasture (bulls, 433±64.5 kg liveweight);

2) an open monopasture system (MPS) with signal grass (cows, 405±37.3 kg liveweight); and

3) a silvopastoral system (SPS) with guinea grass (*Panicum maximum*) as forage and Eucalyptus as tree species (cows, 405±37.3 kg liveweight).

Forage mass as well as crude nutrient, digestible organic matter, and metabolisable energy concentrations were determined by destructive sampling in each paddock. Animals were fitted with automatic chewing sensors (RumiWatch, Itin+Hoch GmbH) to quantify daily ruminating and grazing time and with global positioning recorders (Wintec WBT 202) to measure peregrination. Behavioural measurements lasted 10 d per system after 4 d adaptation during which chewing sensor recordings were validated by visual observation for 8 h/d on three consecutive days. Ambient temperature and humidity were recorded by climate loggers (Hobo Pro v2) throughout the experiment to calculate temperature-humidity indices (THI).

Forage dry mass was similar in all systems with 3.6, 3.6, and 3.4 t/ha in ICLS, MPS, and SPS, respectively ($p = 0.75$). While forage in ICLS and SPS contained more crude protein than in MPS ($p < 0.001$), neutral detergent fiber contents were highest in MPS followed by SPS and ICLS ($p < 0.001$). Accordingly, metabolisable energy concentrations and organic matter digestibility were highest in ICLS and similar between SPS and MPS ($p < 0.001$). The THI was higher in MPS (71.9) and ICLS (70.2) than in SPS (60.7), but did not reach the level of climatic stress in any system.

Strong correlations were found between the time spent ruminating (r^2=0.96), grazing (r^2=0.94), and on other activities (r^2=0.92) determined by the chewing sensors or visual observation (n=112 intervals of 30 min). Daily grazing time was longer in MPS compared to SPS and ICLS ($p = 0.03$), but there was no difference between systems for ruminating

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($p = 0.09$). Animals in ICLS spent more time on other activities ($p = 0.01$) and moved around less than in SPS or MPS ($p = 0.03$).