Forage production and grazing behaviour of beef cattle in agrosilvopastoral systems during the dry season in Brazil

Mariana Pereira¹, Paulina Zawada¹, Jessica Werner¹, Manuel C. M. Macedo², Roberto Giolo de Almeida², Uta Dickhoefer¹

¹University of Hohenheim, Animal Nutrition and Rangeland Management in the Tropics and Subtropics, Germany, ²Embrapa Beef Cattle, Research Group on Integrated Production Systems, Brazil

Introduction
Heat stress imposes an energy cost and fall in productivity, and when coupled with poor nutrition, it challenges the beef cattle production in Brazilian grazing systems, typically in the dry season.

Objective
To evaluate the microclimate, forage canopy structure, and grazing behaviour of cattle on Brachiaria sp. pastures within continuous pasture, integrated crop-livestock, and integrated crop-livestock-forestry systems.

Materials & Methods

 Integrated crop-livestock-forestry (ICLF)
- Soybean crop
- Brachiaria brizantha and Nellore cattle
- Eucalyptus urograndis trees

 Integrated crop-livestock (ICL)
- Soybean crop
- Brachiaria brizantha and Nellore cattle

 Continuous pasture (CON)
- Brachiaria decumbens and Nellore cattle

- Forage accumulation was monthly assessed in 4 paddocks per system from May to August 2019.
- Ambient air temperature and relative humidity were measured every hour and temperature-humidity index was calculated.
- Grazing behaviour of 12 Nellore heifers per system (mean bodyweight 351 standard deviation±32.6 kg) was recorded by chewing sensors during 9 continuous days (1 d adaptation + 8 d measurement) in three 15-d periods.
- 4 animals per system were evaluated per period (n=234).
- Data were analysed by mixed model using SAS V9.4. Statistical significances were tested at P<0.05.

Results

- Heifers had been 343 hours under moderate heat stress and 76 hours under severe heat stress in ICLF. No severe heat stress conditions were observed in ICLF.
- Forage accumulation rate was greater in CON than in ICLF (P=0.04), whereas ICL did not differ from CON (P=0.25) neither from ICLF (P=0.57).
- There were no differences between the systems for leaf proportion (P=0.19) neither for dead plant material proportion (P=0.13), despite 73% of the pasture in CON was composed of dead material.
- Pasture in ICL had greater stem proportion (P=0.01) than in CON and ICLF.
- Canopy structure in CON and ICL likely depressed the bite mass.
- As a compensatory mechanism attempting to maintain intake relatively constant, when the bite mass is decreasing, heifers in CON and ICL increased their grazing bites (P=0.04) compared to ICLF, and spent the longest time grazing in CON (P<0.05).

Conclusions
All the heifers were most of the time under a non-stressful environment, hence in Brazilian dry season, grazing time seems to be more influenced by canopy structure than by thermal conditions.