Thermal comfort of composite beef heifers (*Bos taurus* vs *Bos indicus*) raised in livestock-forest systems in Southeastern Brazil

Amanda P. LEMES[1]*, Lindsay U. GIMENES[1], José R. M. PEZZOPANE[2], Cristiam BOSI[3], Sergio N. ESTEVES[2], André F. PEDROSO[2], Patrícia, P. A. OLIVEIRA[2], Cintia, R. MARCONDES[2], Alexandre, BERNDT[2], Kauê, MAHLMEISTER[2], Alberto, C. C. BERNARDI[2], Teresa, C. ALVES[2], Alexandre R. GARCIA[2]

[1]FCAV-UNESP, Jaboticabal, 14884-900, SP, Brazil. [2]Embrapa Pecuária Sudeste, CP 339, São Carlos, 13570-970, SP, Brazil, [3]ESALQ/USP, Piracicaba, 13418-260 , SP, Brazil
E-mail address of presenting author*: amanda-lemes@hotmail.com

Introduction

Animal productivity may be higher in livestock-forest systems. The shading provided by the trees seems to determine higher performance in cattle breeds that show less resistance to the tropical climate (Castro et al, 2008), what can be associated with regulation of physiological parameters and thermal comfort (Garcia et al, 2011). Thus, our objective was to study the influence of shading on physiological parameters related to thermal comfort of composite beef heifers (respiratory frequency - RF; heart beat frequency - HBF; rectal temperature - RT) and their correlation with bioclimatic indexes.

Material and Methods

The study was conducted at EMBRAPA's (Brazilian Agricultural Research Corporation) experimental station, located in the Southeast region of Brazil (climate Cwa, according Koppen). Thirty-two Canchim (3/8 Nelore + 5/8 Charolais) heifers (16 months old; 211 kg live weight) were randomly allocated to two rotational grazing areas: shaded area (SA; eucalyptus trees in a 15 x 2 m spacing) and non-shaded area (NSA); and evaluated every 14 days, in the morning, from January to April 2015. The RF (breath/min), HBF (beats/min), RT (˚C), temperature-humidity index (THI) and black globe humidity indexes (BGHI) were recorded at the moment of each animal evaluation. The physiological parameters (least square means±SE) were analyzed as repeated measures by PROC GLIMMIX of SAS®. Bioclimatic indexes and physiologic parameters were correlated using PROC CORR of SAS®. Results were significant when $P<0.05$.

Results and Conclusions

Heifers grazing SA had lower RF and RT than those grazing the NSA area (Table 1). There was a positive correlation between THI and RT ($r^2 = 0.32543$, $P<0.0001$), as well as between BGHI and RT ($r^2=0.36285$, $P<0.0001$). The HBF index had negative correlations with THI (-0.19, $P<0.001$) and BGHI (-0,28 $P<0.0001$). It was not observed correlation between THI or BGHI and RF.

Table 1. Least square means ± SE of physiologic parameters.

Area	RF (breath/min)	HBF (beat/min)	RT (˚C)
	P<0.001	*P=0.2558*	*P<0.001*
SA	44.61±0.77	99.17±1.66	39.19±0.05
NSA	49.09±0.76	101.83±1.64	39.58±0.05

The results indicate the necessity of shading in pastures, in order to increase animal comfort and, possibly, zootechnical indexes.

References cited

Castro et al, (2008). Ciência Animal (UFSM. Impresso), 38, 2395-2402.
Garcia et al, (2011). Pesquisa Agropecuária Brasileira, 46 (10), 1409-1414.

Acknowledgements