Correlation between thermal comfort indices and physiological parameters of crossbred dairy heifers

Giovanna Araújo de CARVALHO*[1], Ana Karina Dias SALMAN[2], Pedro Gomes da CRUZ[2], Francyelle Ruana Faria da SILVA[3], Elaine Coimbra de SOUZA[1], Eduardo SCHMITT[4]

*corresponding author: giovanna.carvalhozootec@gmail.com
[1] PPGDRA - Universidade Federal de Rondônia, Porto Velho, Rondônia, Brasil
[2] Empresa Brasileira de Pesquisa Agropecuária, Porto Velho, Rondônia, Brasil
[3] PPGCA – Universidade Federal de Rondônia, Rolim de Moura, Rondônia, Brasil
[4] UFPel – Universidade Federal de Pelotas, Pelotas, Rio Grande do Sul

The effect of environmental climate on physiological responses of dairy cattle has been studied due to its impact on performance herd. This word studied the relationship of three environmental thermal indices with internal temperature (IT) and respiratory frequency (RF) of dairy heifers in Porto Velho, Rondônia. Five Holstein x Gir heifers with 24±3.67 months of age and 319.2±41.11 kg of live weight under grazing system were used in a completely randomized trial with three experimental periods of eight days (seven for adaptation and one for evaluation). Data logger thermometers adapted to intravaginal hormone-free devices registered heifers IT from 08h to 15h in intervals of 10 minutes. The RF was measured at 08h, 10h, 12h and 14h by counting flank movements and was expressed by breath per minute (bpm). Black globe temperature (°C), air temperature (°C), dew point temperature (°C) and air relative humidity (%) were registered with a portable thermohygrometer. Solar radiation (W m^{-2}) and wind velocity (M s^{-1}) were taken from weather station located 500 meters from experimental area. Three indices were calculated: wet black globe (WBGT), humidity temperature (THI) and predicted respiratory rate (PRR). The Pearson correlation was performed by SAS program and means were compared by T test at 5% of significance. All indices had significant correlations with the physiological parameters. The THI and WBGT had higher correlation with RF than with IT (0.648 and 0.666 *vs.* 0.398 and 0.495, respectively). The PRR, in relation to the other indices, had the smallest correlation with IT and the highest with RF (0.381 and 0.760, respectively). The THI, WBGT and PRR can be used to predicted thermal comfort in Girolando heifers.

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