

Influence of season on plasmatic cortisol and IGF -I in dairy cows under thermal comfort

Titto Antonio Lencioni, E.; Titto Gonçalves C.; Negrão Alberto J.; Canaes Souza T.; Leme Mayra Cunha T.; Vilela Alves R.; Geraldo Alves Pereira Mira A.; Pereira, Alfredo Manuel Franco; Nogueira Filho Carlos Machado J.

Universidade de São Paulo, Faculdade de Zootecnia e Engenharia de Alimentos, Departamento de Zootecnia, Laboratório de Biometeorologia e Etologia, LABE/FZEA/USP, Brazil

Objectives: Access to evaporative cooling system can increase production in dairy cows due to improve thermal comfort. The aim of this study was to evaluate the impact of ambient temperature on thermoregulation, cortisol and IGF-I, and determine the efficiency of evaporative cooling system on the physiological responses in different weather patterns.

Materials and Methods: 24 Holstein cows were housed in two groups with or without access to cooling system with fans and mist in the free-stall.

The parameters analyzed were: rectal temperature (TR), body surface (TS), internal base of tail (TC), respiratory rate (FR), cortisol and IGF-I during the morning milking (700h) and afternoon (1430h) in five different weather patterns throughout the year (fall, winter, spring, dry summer and rainy summer).

Results: TR, TS, TC and FR were lower in the morning ($P < 0.01$). Cooling system did not affect rectal temperature, with both groups had values below 38.56 over the year ($P = 0.11$). We observed an upward trend ($P < 0.05$) in plasma cortisol concentrations between autumn and winter, starting the decline until the dry summer and a further increase during the rainy summer. A gradual increase of IGF-I happened between autumn until the dry summer, and decreased during the rainy summer ($P < 0.05$). Cortisol and IGF-I may have been influenced by light hours. TR showed a moderate and positive correlation ($P < 0.001$) with the TS (0.46) and FR (0.35). The air temperature and THI showed positive moderate to high correlations with TR, TC, TS and FR ($P < 0.001$).

Conclusions: The ambient temperature influences positively on the physiological variables, independent of the cooling system, but cooled animals kept milk production even during the summer. The plasma concentrations of cortisol and IGF-I may have been influenced by the seasons and the milk production day, indicating less heat stress.