Effects of an evaporative cooling system on plasma cortisol, IGF-I, and milk production in dairy cows in a tropical environment.

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Abstract

Access to an evaporative cooling system can increase production in dairy cows because of improved thermal comfort. This study aimed to evaluate the impact of ambient temperature on thermoregulation, plasma cortisol, insulin-like growth factor 1 (IGF-I), and productive status, and to determine the efficiency of an evaporative cooling system on physiological responses under different weather patterns. A total of 28 Holstein cows were divided into two groups, one with and the other without access to a cooling system with fans and mist in the free stall. The parameters were analyzed during morning (0700 hours) and afternoon milking (1430 hours) under five different weather patterns throughout the year (fall, winter, spring, dry summer, and rainy summer). Rectal temperature (RT), body surface temperature (BS), base of tail temperature (TT), and respiratory frequency (RF) were lower in the morning ($P < 0.01$). The cooling system did not affect RT, and both the groups had values below 38.56 over the year ($P = 0.11$). Cortisol and IGF-I may have been influenced by the seasons, in opposite ways. Cortisol concentrations were higher in winter ($P < 0.05$) and IGF-I was higher during spring-summer ($P < 0.05$). The air temperature and the temperature humidity index showed positive moderate correlations to RT, BS, TT, and RF ($P < 0.001$). The ambient temperature was found to have a positive correlation with the physiological variables, independent of the cooling system, but cooled animals exhibited higher milk production during spring and summer ($P < 0.01$).