B-19: Diurnal variation in thermoregulatory responses in water buffalo and cattle

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This study examines the diurnal variation in thermoregulatory responses of water buffalo and cattle. Three Surti buffalo heifers and 3 Friesian heifers of similar age (2.5 $\pm$ 0.5 years) and body weight (342.5 $\pm$ 18.2 kg) were used. Both groups of animals were housed indoors and managed identically. Data on skin temperature (ST), rectal temperature (RT), respiration rate (RR), heart rate (HR), and cutaneous evaporation rate (CER) were obtained from individual animals at hourly intervals during 24 h periods (n=10). Data on ambient temperature (AT) and relative humidity (RH) were recorded simultaneously. Ambient temperature and RH fluctuated from 71 to 90°F, and 60 to 88%, respectively. Buffalo had a lower ($p \leq 0.05$) mean ST (89.0 vs 93.7°F), RT (100.7° vs 101.5°F), RR (19.2 vs 29.6 breaths/min.), HR (52 vs 74 beats/min), and CER (0.15 vs 0.17 g/cm/h) compared to cattle. All the physiological parameters exhibited diurnal fluctuations associated with those of AT. Skin temperature of buffalo linearly increased with the elevation of AT(71 to 90°F), while ST of cattle increased in curvi-linear manner. Respiration rate and HR of both species increased ($p \leq 0.05$) linearly with the elevation of AT, but at different magnitudes. Rectal temperature of cattle increased in a curvilinear manner with increasing AT, while RT of buffalo increased more rapidly to reach 101.5°F at 80°F of ambient temperature. These results indicate that, even the open housing conditions can be stressful to Friesian and Surti buffaloes, when day temperatures exceeds 80°F.