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## Evaluation of the Effect of Coat Colour and Coat Type on Physiological Response of Zebu Cattle to Heat Stress in Kenya

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### Abstract

Impacts of global warming such as heat stress have led to reduced beef cattle productivity in tropical, sub-tropical and arid areas. Thermoregulatory mechanisms vary depending on the exposure time to HS, with a cumulative effect on the adaptive responses and thermal strain of the cow. The aim of the study was to evaluate effect of Zebu cattle coat color and type on physiological response during heat stress conditions. This experiment was conducted in Isiolo county, (Ngaramare ward) located in North Eastern part of Kenya. A total of 35 animals were evaluated at 0900 hours and 1300 hours. The following parameters were evaluated: Environmental temperature in degrees Celsius, length of hair, pigmentation level in the coat, rectal temperature, and respiration breaths per minute and heart rate beats per minute. Environmental temperature had a significant effect on rectal temperature and respiration rate ( $p < 0.05$ ), with no significant effect on heart rate ( $p > 0.05$ ). It was found that when Environmental temperature in the morning was  $32.2^{\circ}\text{C}$  and in the afternoon to be  $36.9^{\circ}\text{C}$ , respiration rate increased from  $24.89 \pm 3.54$  to  $37.81 \pm 2.28$  breaths per minute, Heart Rate increased from  $46.86 \pm 5.37$  to  $55.62 \pm 3.66$  beats per minute while Rectal Temperature increased  $37.82 \pm 0.19^{\circ}\text{C}$  to  $38.54 \pm 0.12^{\circ}\text{C}$ . Coat color and type did not show any significant effect on rectal temperature and respiration rate ( $p > 0.05$ ). Coat color provided significant effect on heart rate ( $p < 0.05$ ), while Coat type did not also show significant effect on heart rate ( $p > 0.05$ ). Dark brown animals had got the least mean heart rate  $23.85 \pm 12.11$  beats per minute, while fawn had got the highest mean Heart Rate  $75.52 \pm 7.79$  beats per minute. Fawn colored animals also had lower respiration rate compared to dark brown animals with average of  $29.87 \pm 5.01$  and  $32.72 \pm 7.51$  breaths per minute respectively. Within the range of red color group fawn colored animals having the highest heart rate also had the lowest rectal temperature  $37.85 \pm 0.27^{\circ}\text{C}$  and the least coat length of  $0.60 \pm 0.24$  mm. To summarize the study, Heat stress negatively impacted the Zebu cattle performance in tropical countries. Zebu coat color and length coat hair confer physiological adaptation within range of red color group, with fawn colored being more resilient. There is need to provide shade and drinking water for darker animals.

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