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Evaluation of panting score to estimate heat stress in buffaloes Category

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Abstract

Extreme summer conditions result in millions of dollars in lost revenue every year due to production and death losses. A study was conducted to determine risk factors for heat stress in feedlot heifers. Two hundred fifty-six feedlot heifers of four genotypes (32/genotype/year) were observed for 6-8 weeks in two consecutive summer time periods. Six young Murrah male calves, 7 to 9 months old 165-200kg, were exposed to solar radiation during summer. Panting score as a measure of heat stress in cattle based on behavioral signs including the rate and depth of respiration and the amount of drooling. They developed a tagged visual analogue scale labelled with descriptors to score the panting.

Introduction

Buffaloes are the major contributors of the milk production in india sharing more than 50% of the total milk produced in the country since 1997, Buffaloes are more prone to heat stress because of their dark-colored skin, sparse hair coat and scanty sweat glands which compromises which their heat dissipation capacity. One of the greatest challenges being faced by producers and livestock around the world is thermal stress. Thermal stress is a major limiting factor in livestock production under tropical climate and also during the summer season in temperate climates. Thermal stress strongly affects animal bioenergetics, with adverse effects on the performance and well-being of livestock. Heat stress can have a very negative impact on milk production, reproduction and general health of livestock (4). The performance of farm animals is strongly influenced by the thermal environment. Ambient temperature below or above the thermo neutral range creates stress conditions in animals. The thresholds (both cold and hot environ mental challenges) beyond which potential thermal stressors can influence performance and health are influenced by various factors such as animal sps, genetics, age or life stage, level of nutrition, (7)

Quantifiable measures such as physiological, behavioral and biological responses to heat load are useful indicators of thermal stress. Panting score was introduced as a measure of heat stress based on behavioral signs, including the rate, depth of respiration and amount of saliva drooling.

Since there is a paucity of information on estimation of heat stress using panting score in buffaloes. The panting score was introduced as a measure of heat stress based on behavioral signs including the rate and depth of respiration and the amount of drooling. They were told how to score panting using a tagged visual analogue scale labelled with descriptors of an increasing degree of panting (Fig. 1). Such tagged visual analogue scales do not limit the precision and sensitivity with which observers can distinguish different degrees of severity of the condition concerned. (5)

Review

Das et *al*. (1999) reported variations in skin surface temperature and physiological responses in Murrah buffaloes exposed to direct solar radiation during summer and concluded that to achieve greater production, heat alleviation measures are required artificially.

Tuyttens et *al.* (2006) introduced panting score as a measure of heat stress in cattle based on behavioural signs including the rate and depth of respiration and the amount of drooling. They developed a tagged visual analogue scale labelled with descriptors to score the panting.

Brown - Brandlet *al.* (2006) reported that temperature, breed, condition score, health, history and temperament had effects on both respiration and panting score which were used to study the heat stress in feedlot heifers.

Gaughanet *al.* (2007) reported that body temperature and respiration rates are reliable indicators of heat load which are difficult to measure under field conditions. They concluded that panting score is an alternative method to asses heat stress in cattle.

Vaidya et *al.* (2010) recorded heat load index between 78 to 93 in Karan Fries cattle during summer which is influenced the heat dissipation through skin and pulmonary system. they suggested better managemental practices if the heat load index exceeds 78 in the microclimate of the animals.

Seerapu S R et *al*.(2015) reported that micro climate alteration by the provision of foggers and air circulators in the buffalo houses increased feed intake resulting increased milk production, fat and SNF due to reduced heat stress in buffaloes.

Choudhary B et *al.*,**(**.2019) reported that The maximum temperature and minimum humidity (viz. maximum THI) are the most critical weather parameters causing thermal stress in animals, however, the climatic conditions in the region are such that not only maximum but also minimum THI crosses the critical threshold providing little relief to the animals during the night.

Results And Discussion

The difference between mean of minimum and maximum temperature, at fore head (20.09˚C), back middle (22.36˚C), foreleg (18.50˚C), pinna (18.21˚C) was higher than the temperature gradient of neck middle (13.96˚C), rump (16.13˚C), foreleg upper (14.75˚C), hindleg upper (14.58˚C), hind leg lower (15.84˚C), (2). heat load index between 78 to 93 in Karan Fries cattle during summer which is influenced the heat dissipation through skin and pulmonary system. they suggested better managemental practices if the heat load index exceeds 78 in the microclimate of the animals (6). The

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critical threshold level of maximum temperature-humidity index (THI) was estimated to be 74, which is higher than that of crossbred cows. The duration of discomfort period for buffaloes begins in mid-March and lasts up to early November. During the aggravated stress condition (THI > 82) prevailing in the region for about 5 months starting from early May, milk productivity declines by more than 1% per unit increase in maximum THI over 82 (7). Extreme summer conditions result in millions of dollars in lost revenue every year due to production and death losses. A study was conducted to determine risk factors for heat stress in feedlot heifers. Two hundred fifty-six feedlot heifers of four genotypes (32/genotype/year) were observed for 6-8 weeks in two consecutive summer time periods (1). The THI does not include important climatic variables such as solar load and wind speed (WS, m/s). Likewise, it does not include management factors (the effect of shade) or animal factors (genotype differences). Over 8 summers, a total of 11,669 Bos taurus steers, 2,344 B. taurus crossbred steers, 2,142 B. taurus × Bos indicus steers, and 1,595 B. indicus steers were used to develop and test a heat load index (HLI) for feedlot cattle. A new HLI incorporating black globe (BG) temperature (°C), relative humidity (RH, decimal form), and WS was initially developed by using the panting score (PS) of 2,490 Angus steers. The HLI consists of 2 parts based on a BG temperature threshold of 25°C: HLIBG>25 = 8.62 + (0.38 × RH) + (1.55 × BG) − (0.5 × WS) + e(2.4−WS), and HLIBG< 0.001, and R2 = 0.26, P < 0.001, respectively. The R2 for the relationships between HLI or AHL and PS were positive (0.93 and 0.92 for HLI and AHL, respectively, P < 0.001), (3).

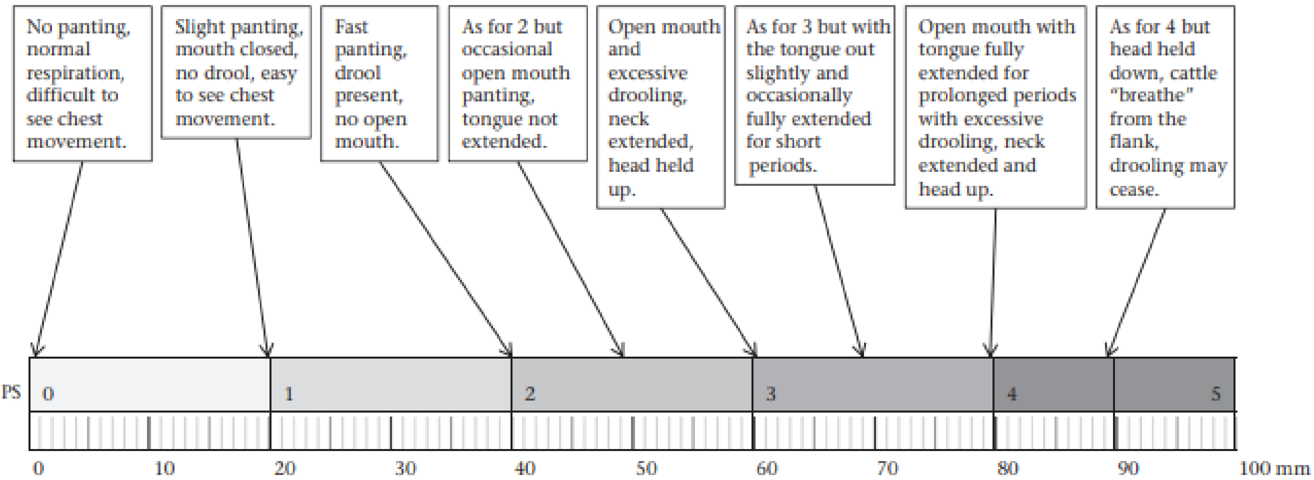

Figure 1. The 100 mm tagged visual analogue scale labelled with descriptors used for scoring panting in cattle during trial 2.

Conclusion

Variations in skin surface temperature and physiological responses of Murrah buffaloes revealed that direct exposure to solar radiation during summer causes distress to the young animals. During summer young animals are not able to maintain their body heat balance even after employing behavioral processes of thermoregulation. In order to achieve greater production, the heat alleviation processes must be aided artificially.

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