

Abstract

Impacts of Heat Stress on the Physiological and Production Responses of Lactating Dairy Cows Grazing Pastures over Hot Summer Months [†]

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Abstract: Heat stress (HS), a major challenge for sustainable livestock production justifies the need for productive thermotolerant cattle. We measured body temperature (non-invasively using a FLIR T1200 thermal imaging camera), respiratory rate and panting scores of 120 Holstein Friesian cows at the University of Melbourne Dookie Dairy Farm weekly during the summer period (December 2018–February 2019). The effect of Temperature–Humidity Index (THI) on milk production, protein content, fat content was also measured. We categorized THI as low (≤ 72), moderate (73–82) and high (≥ 83) and observed a highly significant ($P \leq 0.01$) effect of THI on respiratory rate (66.7, 84.7 and 109.1/min), panting scores (1.4, 1.9 and 2.3) and average body temperature of cows (38.4, 39.4 and 41.5). Average milk production parameters were also significantly ($P \leq 0.01$) affected by THI: daily milk production dropped by 14% from high to low THI, milk temperature and fat% increased by 3% whilst protein% increased by 2%. Highly significant ($P \leq 0.01$) positive correlations were obtained between THI and milk temperature, fat% and protein% whilst the reverse was observed between THI and milk yield, feed intake and rumination minutes. Under moderate and high THI, most cows sought shade, spent more time around watering points and showed signs of distress (excessive drooling and open mouth panting). These findings clearly indicate that lactating dairy cows grazing summer pastures experience severe HS compromising their welfare. The quantum of production losses, though significant may however be lower than previously reported in studies using climatic chambers.

Keywords: milk yield; thermotolerance; temperature humidity index; milk temperature

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