

Forced ventilation and evaporative cooling of waiting and milking areas and its influence on the physiological and production responses of crossbred Holstein × Zebu cows

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Abstract

The main objective of this work was to evaluate the effect of forced ventilation and evaporative cooling on the physiological and production responses of dairy cows Holstein × Zebu.

Experiments were conducted with 32 crossbred cows (Holstein × Zebu) in the same lactation phase, mean daily production of 17 kg and mean body weight of 550 kg. Four different treatments were randomly assigned to groups with eight cows each. The treatments were: Evaporative cooling in the waiting room + forced ventilation with Evaporative cooling in the milking room (NW+VNM), Evaporative cooling in the waiting room (NW), forced ventilation with Evaporative cooling in the milking room (VNM) and a control treatment without forced ventilation and evaporative cooling (CON). Experimental work was realised in a commercial farm located in the interior of Bahia State, Brazil, during 45 days in January and February.

Climatic data were measured using a meteorological station. Temperature Humidity Index (THI) and Wet Bulb Globe Temperature (WBGT) were calculated. In order to study animal responses milk production, udder temperature, heart rate, respiratory rate, temperature of white and black spots and rectal temperature were measured.

It was observed that the cows under VNM treatment presented higher milk production and lower udder temperature, heart rate, respiratory rate, temperature of white and black spots. No significant differences occurred in the rectal temperature. Results showed that forced ventilation and evaporative cooling positively influenced environmental conditions showing the importance of evaporative cooling for dairy cows.

Keywords: Environmental control, evaporative cooling, thermal comfort

Introduction

The cows, as a homoeothermic animal, when remaining in conditions outside the thermo neutral zone modify their metabolism in an attempt to maintain internal body temperature, with negative effects on milk production. Berman *et al.* (1985) reported that selection for milk production reduced the thermoregulatory ability for heat stress conditions. The optimum temperature for milk production depends on the species, race and tolerance to heat and cold. According to Keown *et al.* (2005), the ideal temperature for dairy cattle is in the range between -4 °C and 18 °C. When the temperature reaches values above 26.7 °C, these animals reduces food intake, causing a negative impact on production. At 32 °C or above, a decrease in milk production ranging from 3 to 20% can be observed.