Thermal comfort of high yield dairy cows during diurnal voluntary milking: preliminary results

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Automated milking systems are a modern technological resource that can contribute to the improvement of the productivity of animals raised in tropical climate regions. Since it is a voluntary system, the cows are able to decide how often and when they are most comfortable being milked. However, there are no studies on the use of automatic milking systems for pasture grazing animals. Thus, the study aimed to characterize the thermal comfort of high producing dairy cows reared in an integrated crop-livestock-forest system on voluntary milking during the daytime. The experiment was conducted at Embrapa Pecuária Sudeste, São Carlos-SP (22°01'S, 47°53'W, 860m), in an altitude tropical climate (Cwa, according to Koppen). Sixty-one lactating Holstein and Jersolanda (½ Holstein; ½ Jersey) dairy cows were milked on a voluntary system (DeLaval VMS™ V300). Data collections were performed monthly, for two consecutive days, from 8:00 AM to 6:00 PM, from December 2021 to April 2022. The average time of cows' permanence inside the milking complex (waiting area + milking parlor) was 105 minutes. After entering the milking parlor, the Respiratory Rate (RR; breaths/min) was evaluated by counting the flank movements and the Rectal Temperature (RT; °C) was measured using a digital clinical thermometer. Monitoring of climatological data was done using a HOBO MX2301A sensor, installed inside the milking parlor, from which the instantaneous Temperature and Humidity Index (THI), used to estimate thermal comfort, was calculated. Statistical analysis was performed in the Bioestat 5.4 program, with a significance level of 5%. In spite of their breed, RR and RT were not significantly different ($P>0.05$). However, RR and RT increased during the hottest hours of the day (11:00 AM to 4:00 PM). The overall mean of RR was 36.5 breaths/min, above the ideal range of 10 to 30 breaths/min. Although the average THI was 74.3, a value considered critical for dairy cows, the animals presented TR values (38.48°C) within the normal range (38.0 to 39.0°C) for dairy cows. THI showed positive correlation with RR ($r=0.63$; $P<0.0001$) and RT ($r=0.55$; $P<0.0001$). It is concluded that the respiratory rate and rectal temperature of dairy cows are subject to temperature and humidity fluctuations during daytime milking, but the animals were in thermal comfort. This reinforces the need to provide a comfortable environment in the voluntary milking system, to avoid negative impact on productivity.