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Corrigendum

Corrigendum to "A predictive model of equivalent temperature index for dairy cattle (ETIC)" [J. Therm. Biol. (2018) 165–170]

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The authors regret that there was some correction in the text which are as follows.

3.4. Stress threshold categories based on ETIC

Fig. 3 shows the scatter plot of THI against ETIC for which the data of air temperature and relative humidity were randomly generated from 20 to 40 °C air temperature and 15–80% relative humidity. The relationship between THI and ETIC at an assumed air velocity and solar radiation equal to zero can be described by a linear regression equation: $y = 0.6388 \times -25.758$ (where, y represents ETIC (°C), and x represents THI.) ($R^2 = 0.9932$, and $p < 0.0001$).

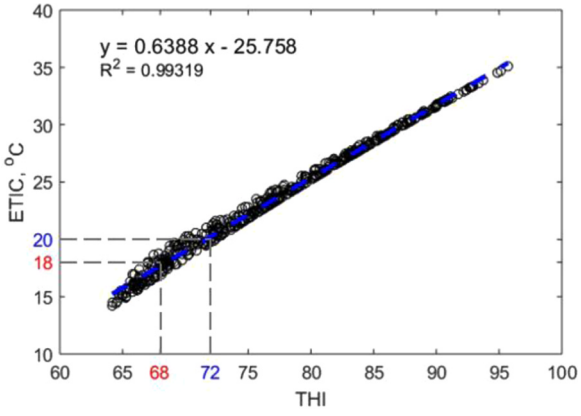

Fig. 3. Relationship between THI and ETIC assuming that air velocity and solar radiation were 0 m s^{-1} and 0 W m^{-2}, respectively. The data for air temperature ranging from 20 to 40 °C and relative humidity ranging from 15% to 80% were randomly generated (N = 500). The THI of 68 is equivalent to the ETIC of 18 °C and the THI of 72 is equivalent to the ETIC of 20 °C.

Based on the linear regression model in Fig. 3, the stress categories (thresholds) for ETIC can be classified in accordance to the thresholds developed for the THI (Eq. (13)), assuming that air velocity = 0 m s^{-1} and solar radiation = 0 W m^{-2}. The categories are: 18 °C ≤ ETIC < 20 °C is considered to be *Mild*, 20 °C ≤ ETIC < 25 °C is considered to be *Moderate*, 25 °C ≤ ETIC < 31 °C is considered to be *Severe*, and ETIC ≥ 31 °C is considered to be *Emergency* (Table 3).

Heat dissipation rate and body heat balance are affected by not only environmental parameters, but also other factors related to the animal and management of the herd, such as genotype of cows, coat colour, health status, degree of acclimatization, productivity level, activity level, access to shade, and manure management (Gaughan et al., 2008). These animal- or management-related factors would change the ranges of the thresholds and stress categories. For instance, some studies re-

Table 3
Stress categories of ETIC thresholds. The thresholds are based on THI (Eq. (13)) assuming that air velocity = 0 m s^{-1} and solar radiation = 0 W m^{-2}.

Category	THI	ETIC, °C
Mild	68 ≤ THI < 72	18 ≤ ETIC < 20
Moderate	72 ≤ THI < 80	20 ≤ ETIC < 25
Severe	80 ≤ THI < 90	25 ≤ ETIC < 31
Emergency	90 ≤ THI	31 ≤ ETIC

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ported a THI of 72 (equivalent to ETIC of 20.2 °C) as the threshold at which dairy cattle start to be in heat stress (Bernabucci et al., 2014; Bohmanova et al., 2007; Ravagnolo et al., 2000); however, much of this work is based on changes in production, rather than earlier responses to heat load. Similarly, a THI of 60 (equivalent to ETIC of 12.5 °C) was reported as the threshold for beginning heat stress for Holstein cows in Germany (Brügemann et al., 2012). In this study, the ETIC is based on only environmental parameters and the categories correspond to that of the THI.

4. Conclusions

The following conclusions can be drawn from this study:

(1) A thermal index model, referred to as ETIC, was developed. The model predicts the level of heat stress imposed on cattle. The model incorporates the effects of air temperature, relative humidity, air velocity, and solar radiation and their interactions.
(2) The coefficient of correlations (R^2) between the ETIC and skin temperature, core-body temperature, and respiration rate were 0.79, 0.40, and 0.49, respectively.
(3) The ETIC heat-stress thresholds were categorized according to the thresholds defined for THI. The categories are: *Mild* for 18 °C ≤ ETIC < 20 °C; *Moderate* for 20 °C ≤ ETIC < 25 °C; *Severe* for 25 °C ≤ ETIC < 31 °C; and *Emergency* for ETIC ≥ 31 °C.
(4) The predictive performance of the ETIC model was better than the adjusted THI, HLI, CCI, and DHLI indices with respect to skin temperature (R = 0.89), respiration rate (R = 0.70), and core-body temperature (R = 0.64).

The authors would like to apologise for any inconvenience caused.