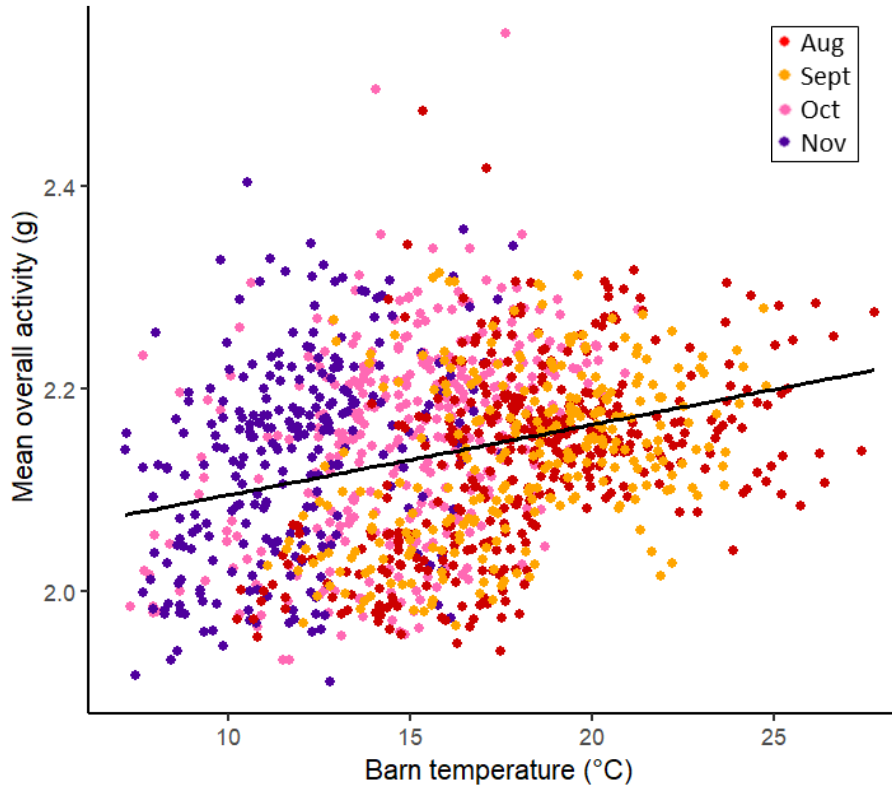


Supplemental File S2. Activity in relation to barn temperature

Here we show how activity data were recorded and analysed in relation to barn temperature. The accelerometers determined the overall activity by computing the mean of a filtered VeDBA (Vectorial Dynamic Body Acceleration). This measure was derived by taking the square root of the sum of squares of the dynamic x, y, and z acceleration values (as described in Qasem et al. 2012). The mean was then calculated using a sliding window of 32 data points for each sensor. The data underwent filtering both before and after the sum of squares calculation, to account for low-frequency components, including gravity. When we mention ‘hourly overall activity’, we are referring to this VeDBA measure averaged over the entire herd on an hourly basis.

The hourly overall activity data were briefly pre-processed by removing non-sensical values where overall activity was consistently recorded as 0 throughout the day on 03/10/2014 (0.95% of original hourly data), likely due to the accelerometers temporarily malfunctioning. As the data do not follow a normal distribution (Shapiro-Wilk test statistic (W) = 0.99, P = 2.05e-9 and W = 1.00, P = 0.001) for the hourly overall activity and barn temperature, respectively), we used a Spearman’s Rank Coefficient to analyse the relationship between hourly overall activity and hourly barn temperature.

There is a significant positive correlation between hourly overall activity and hourly barn temperature (Supplemental File S2.1; Spearman's rank correlation [ρ] = 0.28, S = 236179396, P < 2.2e-16, n = 1256).



Supplemental Figure S2.1. Relationship between barn temperature (C) and mean overall activity (n = 1256). A single point represents an average per hour and points are colored by month: August = red, September = orange, October = pink and November = purple.

REFERENCES

Qasem, L., A. Cardew, A. Wilson, I. Griffiths, L. G. Halsey, E. L. C. Shepard, A. C. Gleiss, and R. Wilson. 2012. Tri-axial dynamic acceleration as a proxy for animal energy expenditure; should we be summing values or calculating the vector? *PLoS One* 7:e31187. <https://doi.org/10.1371/journal.pone.0031187>