Spring 2023

# AGEN/BSEN 112 Final project: Moving and Temperament of Cattle

Elly Vo

Taetum Baxa

Ved Patel

Brady Giles

Tami M. Brown-Brandl

*See next page for additional authors*

Authors
Elly Vo, Taetum Baxa, Ved Patel, Brady Giles, Tami M. Brown-Brandl, and Rossana Villa-Rojas

# AGEN/BSEN 112 Final project: Moving and Temperament of Cattle

*AGEN/BSEN-112*

—

“Does MOOving Make Cows Mad?”

Kool Kids inc.

—


Authors:

Elly Vo - 14989788

Taetum Baxa - 62059943

Ved Patel - 57486042

Brady Giles - 55639544

**Problem Statement**

Dr. Tami Brown-Brandl wants to study the effect of temperament (calm vs excitable) and evaporative cooling on the body temperature of moving animals to optimize the environmental conditions around the cattle and consequently, dairy production.

**Objectives**

- Ascertain the impacts of moving cattle from the pen to the building and back on their body temperature.
- Analyze the relationship between the cattles temperament (excited vs. calm) and its increased body temperature during moving.
- Analyze the impact of wet treatment on the temperature and temperament of the cattle.

**Background Information**

Weather patterns can greatly affect cattle movements, leading to an average raise in body temperature of 0.3 °C to 0.8 °C (Mader et al. 2005). The natural behavior of animals based on the biology of their temperament can also be influenced by the body temperature of the animal. Cattle take several days to resume their normal eating patterns after being overheated. Non Typical cattle behavior include reduced time at feeding troughs and prolonged lying down compared to non-worked cattle. Abnormal patterns can also be seen in breathing rates: an increase in breathing causes decreasing hydration levels. Water can be applied externally to cattle hide to allow for effective evaporation and heat loss (Bjurstrom et al., 2020). Cattle housed in hot and humid environments while being sprinkled with water had lower body temperatures and respiration rates compared to control cattle. Gaughan et al. (2010) observed sprinkling was found to have a decrease of approximately 0.6 °C in body temperature.

**3. Methodology**

3.1 Sampling Plan

To analyze and compare the temperament of the heifer cows while moving, the influence of temperature on changes in cow temperament during movement will be analyzed across six different heifers and their temperature in ℃ over 24 hours. Three of the heifers were labeled as excitable, and three calm. The temperature of each was measured once per minute. A conversation with the client will be had to solidify how this temperature is gathered for each of the heifers, determining exactly what equipment was used. Excitability and calmness was

measured by the general presentation of the heifers. “Excitable” heifers are skittish and will distance themselves when approached by humans, while a person’s presence will not affect heifers labeled as “calm.” To analyze this data, the maximum temperature reached as well as the general range of temperature will be compared to the categorization of each cow as well as the given 38℃ average temperature of a heifer. Because the cows are already labeled as either “excitable” or “calm,” they will be separated into treatment groups: dry and wet. From their average distribution of each excitable heifer’s temperature will be compared to that of the calm heifers, presumptively giving a trend in the data.

3.2 Explanation of data analysis techniques

The data and results were split into two treatment groups: dry heifers and wet heifers. From their the data was graphed using excel and the results were used to analyze the affect of the treatments on the temperament of the heifers. All graphs will have time measured in seconds on the x-axis, and body temperature measured in °C for the y-axis. The averages of the temperatures for each graph will be calculated and used to compare the relationship among the two groups.

**4. Results**

When looking at the effect of a wet treatment vs. no treatment (Fig. 1 and 2), a wet treatment plays a big role in cooling the cows off. Looking at the excitable heifers data for wet treatment and no treatment, the heifer treated with cooling spiked when moving, but quickly dropped back to its original 38.5°C after just 5 hours. The dry, excitable heifers had the same spike when first moved, but did not return to normal temperature until about 16 hours later. This shows the huge benefit to giving the heifers a wet treatment after movement to keep their temperature down.

***Table 1.*** *Body temperature (°C) average and range for excitable and calm heifers after wet and no treatment (dry)*

| Treatment | Excitable | | Calm | |
|---|---|---|---|---|
| | Average | Range | Average | Range |
| **Dry** | 38.54±0.33 | 38.17-40.40 | 38.60±0.24 | 38.18-39.09 |
| **Wet** | 38.61±0.20 | 38.14- 39.28 | 38.60±0.25 | 38.09-39.25 |

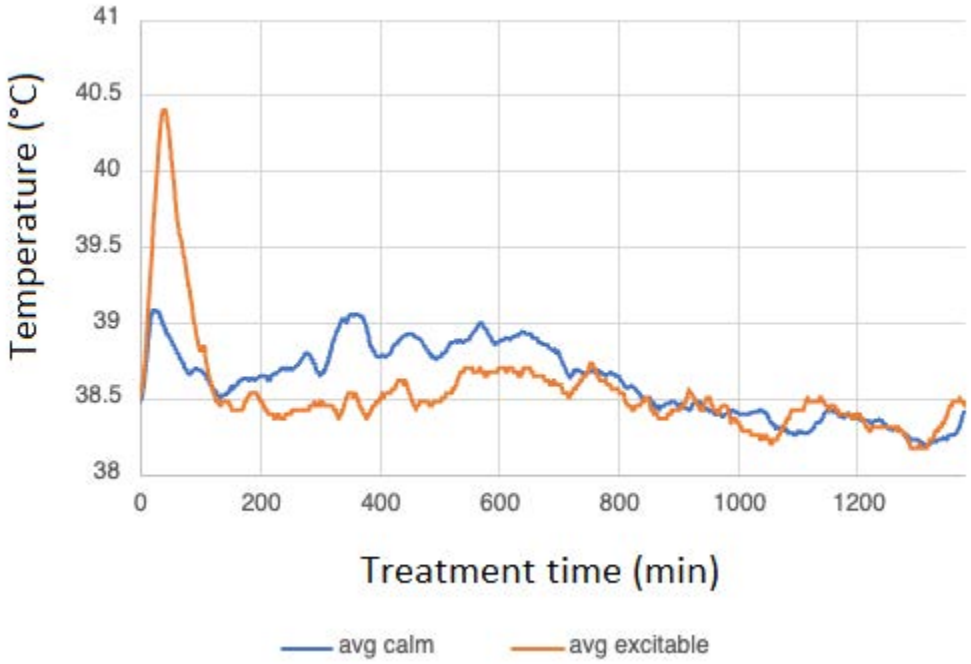


***Figure 1.*** *Body temperature analyzed over time from the dry sample of heifers.*

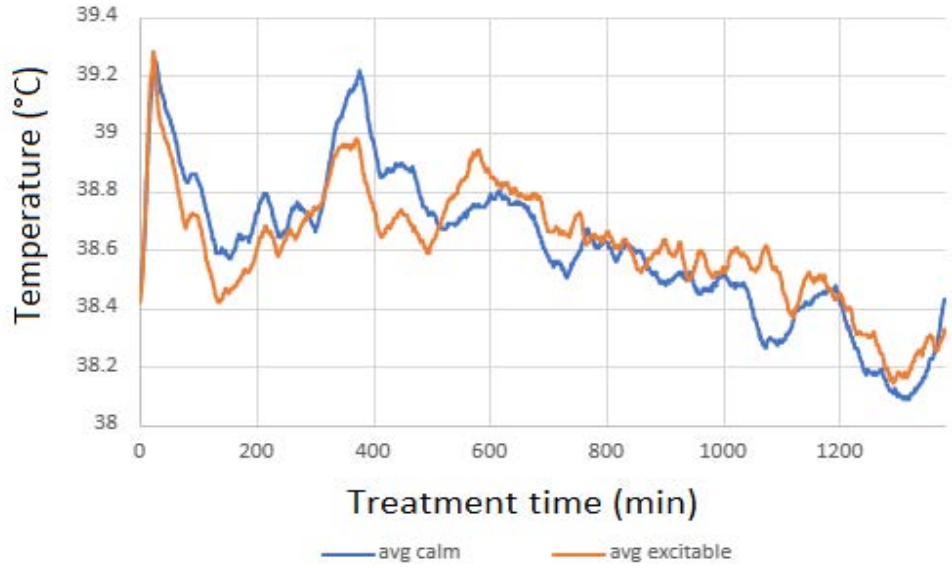


***Figure 2.*** *Body sample analyzed over time from sample of wet heifers.*

In figure 1, the heifers were given no (dry) treatment, and the trends showed a huge spike in the body temperature of a heifer with an excitable disposition. In comparison to figure 2 where the heifers were given the treatment (wet), the trends in body temperatures between the excitable and calm heifers stayed fairly consistent. This showed that the wet treatment was overall effective in helping decrease the skittish nature of excitable cows and help them maintain similar body temperatures to calm heifers.

## 5.0 Conclusions and Recommendations

### 5.1 Main Findings

*Objective 1:*

The movement of cattle had a consistent effect on their average body temperature as shown by the results. As time went on during the movement process, all cattle saw an increase in body temperature. On average, starting temperature of the cattle was about 38.3 °C, and the average max temperature hovered around 39.3 °C. This shows a general upwards trend in average body temperature as a result in movement.

*Objective 2:*

A clear difference between calm and excitable heifers can be deduced by looking at the results. The temperature of both calm and excitable heifers seem to hit a max at about 20:00, but the behavior of each identity following this timestamp varies. And the maximum temperature reached by excitable heifers was higher than the body temperature of calm heifers. Unaided cooling (dry treatment) was also affected by temperament of the cows. Calm heifer's temperature dropped 0.1 °C about every 2 hours, while excitable heifer's temperature dropped 0.1 °C about every 6 hours.

*Objective 3:*

Extended periods of excess temperature caused the heifers to be classified as excitable compared to the short-term raised body temperature of the calm heifers. And two, wet treatments help the heifers shorten excess periods of elevated body temperature.

### 5.2 Recommendations

Based on the data collected and analysis of the results to the identified objectives, is recommended to treat all heifers with a wet treatment after movement. In an effort to keep heifers calm and therefore easier to corral and deal with, a wet treatment will be advantageous.

References

Mader, T. L., Davis, M. S., & Kreikemeier, W.M. (2005). Case study: tympanic temperature and behavior associated with moving feedlot cattle. *Applied Animal Science*, 339–344. https://doi.org/10.15232/S1080-7446(15)31225-0

Bjurstrom, A., Grotjan, S., Van Os, J., & Young, A. (2020). *Animal handling during heat stress - dairy*. University of Wisconsin-Madison. https://dairy.extension.wisc.edu/files/2021/02/Animal-Handling-during-Heat-Stress.pdf

Gaughen, J. B., Johnson, L. J., & Mader, T. L. (2010). *A comprehensive index for assessing environmental stress in animals*. University of Nebraska-Lincoln. Retrieved April 2, 2023, from https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1004&context=extfacpub