

Use of an Ear Tag Based Behavioral and Temperature Monitor (Cow Manager^R) on Dairy Calves (Preliminary Report)

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Summary and Implications

Measuring the behavior of dairy calves can possibly lead to better understandings of the welfare, nutrition, and management of the calves. Behavioral monitoring systems based on accelerometer technology and proprietary algorithms for behavior categorization are commercially available for dairy cows. During this work, 12 calves (6 at a time) were fitted with an ear tag based behavior and temperature monitor (Cow Manager, Agis Automatisering, Netherlands) to evaluate behavior and ear temperature changes from birth through 90 days of age. To our knowledge, this is the first study to use this technology in calves.

The study is still undergoing with data to be subsequently analyzed and interpreted. This paper shows a representative behavior graph of one calf as well as associated health and movement events during that calf's early lifetime. The ear tag was very useful in monitoring animal movement and behavior over time, and reflected changes were seen during health, or normal large movement events (weaning, pen moves). Since the tag's algorithms, behavioral activities, and alerts are based on adult cows and animals, some issues were seen which would need to be modified with new algorithms and behaviors to reflect calf behavior. Calf bottle feeding was categorized as rumination. The accelerometer movements are similar but categorization of the behavior associated with that movement is different in calves (nursing on bottles vs. rumination). Also, calves consistently showed up on the health alerts screens as their limited eating and high inactivity as young calves (normal activity) was seen and categorized as potentially sick animals. New algorithms and health mark benchmarks and parameters must be established based on calf behaviors.

Introduction

Calves and young stock offer the future potential and progress of dairy herds. Critical care and well-being of these animals is essential for long terms health and performance. The potential of precision systems to monitor animal behavior and performance are commercially available for adult dairy cows. The potential for this technology to monitor young calf behavior and performance has not been evaluated. The objective of this project was to implement and evaluate an ear tag based behavior and temperature

monitor (commercially available for cows) on baby calves from birth to 90 days old.

Materials and Methods

Animals: Eartags (Cow Manager SensOor, Agis Automatisering, Netherlands) were placed in the left ears of baby dairy calves the day they were born. Initially 6 tags were placed in 6 calves. Eartags and data were monitored for the 1st 90 days of life. Tags were removed and were put on an additional 6 calves and monitored for 90 days (still in progress). Calf health and performance data was monitored and recorded as part of SOP of the ISU Dairy. When all calves are completed, data will be analyzed to assess calf behaviors and relationships to health and performance.

Behavior monitoring system: A graphical representation of the Cow Manager Behavior Monitoring system is shown in Figure 1. Eartags that encompass an accelerometer and temperature sensor (SensOor) are placed strategically in the ear. Data is transmitted to a wireless router, and ultimately to a hard wired router coordinator at the computer. Raw data is sent via the Internet to Agis and proprietary algorithms transcribe the data into appropriate graphs and behavior and temperature charts for evaluation and alerting.

Discussion

A representative behavior graph and some associated health and normal movement times (weaning, pen moves) is shown in Figure 2. The graph reflects that the sensor worked and could adequately measure and quantify movements over time and trends, as well as associated issues with health and animal movements. Certain issues related to the tag having algorithms and behaviors associated and based on cows were encountered. One was bottle feeding was seen as rumination (same movement but different behavior based on calf vs. cow). Also, calves were consistently on the health alert list as their normal early life behavior (mostly inactive with a few eating bouts per day) was seen as abnormal from a cow perspective. The graph and our data shows these behavior systems may be very useful and valuable in measuring and monitoring calf performance, but systems must be validated and appropriate algorithms developed to reflect calf behaviors and movements.

Overall Summary and Conclusion

During this work, 12 calves (6 at a time) were fitted with an ear tag based behavior and temperature monitor (Cow Manager, Agis Automatisering, Netherlands) to evaluate behavior and ear temperature changes from birth through 90 days of age. To our knowledge, this is the first study to use this technology in calves. This paper reports

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some preliminary work and a behavior graph of a calf over 90 days (birth – 90 days of age). The graph reflects that the sensor worked and could adequately measure and quantify movements over time and trends, as well as associated issues with health and animal movements. Certain issues related to the tag having algorithms and behaviors associated and based on cows were encountered. One was bottle feeding was seen as rumination (same movement but different behavior based on calf vs. cow). Also, calves were

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Figure 1. Cow Manager Behavioral Monitoring System (Agis Automatisering, Netherlands)).

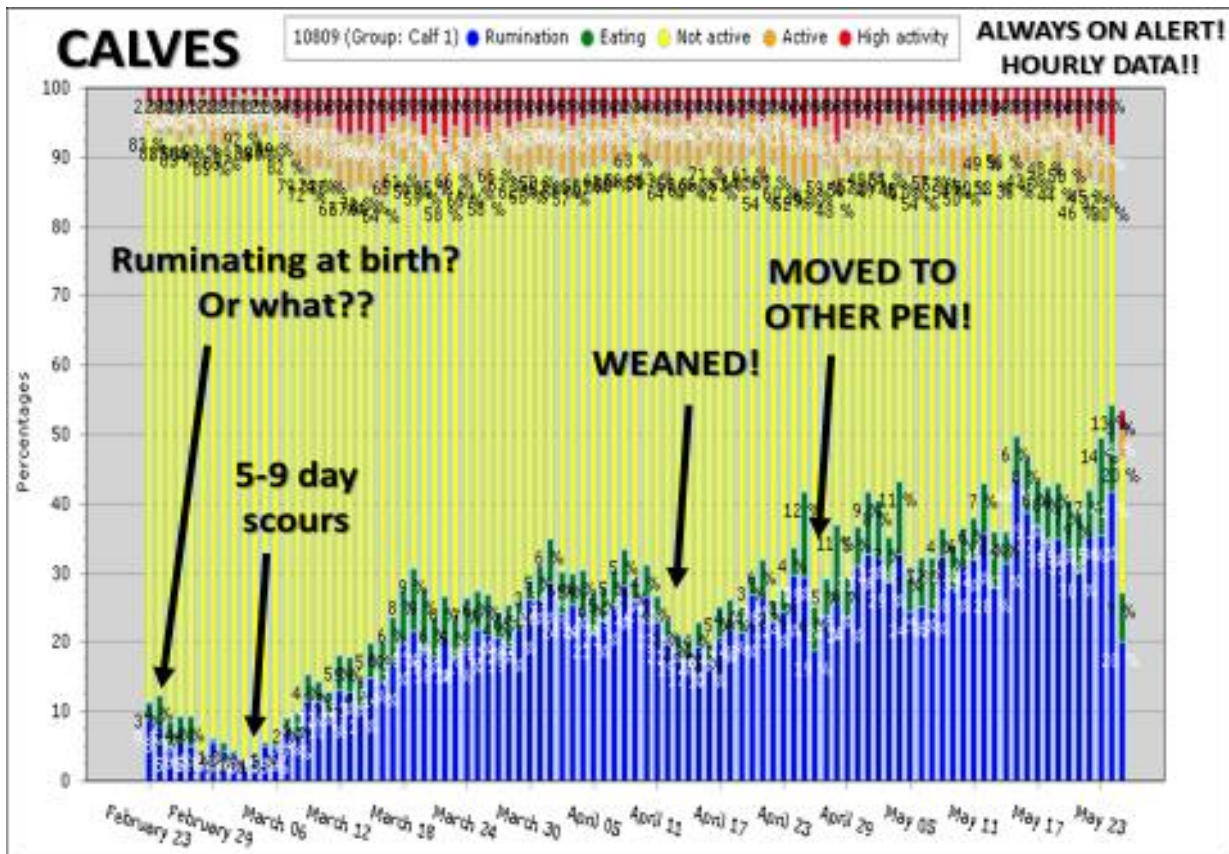


Figure 2. Behavioral graph and associated events of a dairy calf from birth through 90 days of life.