



### Characterizing Activity Budgets of Free-Range Beef Cows

*Prepared by Temitope Oloyede, Dr. Carolyn Fitzsimmons, Dr. Changxi Li and Dr. Edward Bork*

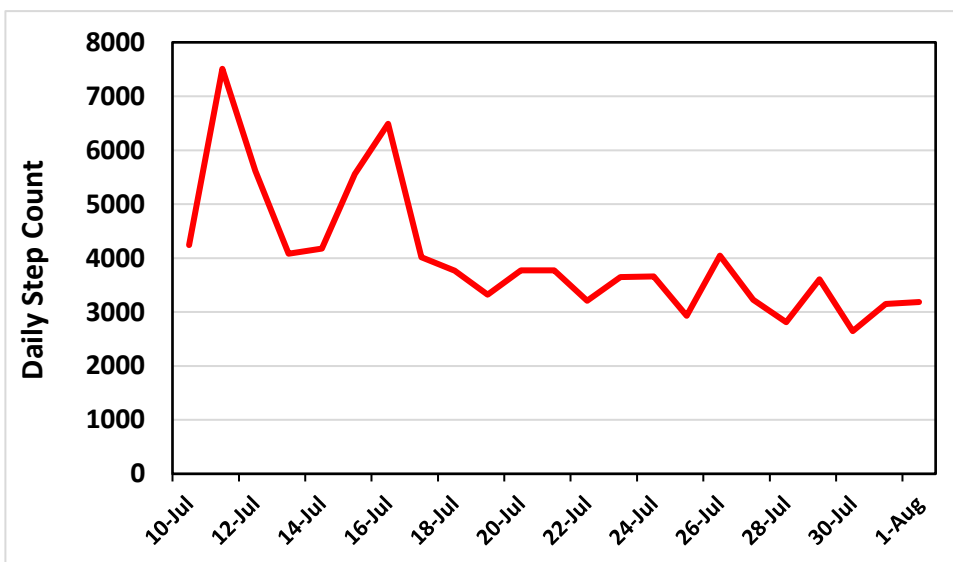
Beef cattle grazing on open rangelands exhibit complex activities during feeding, which is unlike cattle fed in drylot under confined conditions. These activities include time spent travelling between resting and feeding areas, as well as time searching for optimal forage sources. It also includes the proportional time spent resting and ruminating. Time allocated to walking, standing and lying down will reflect not only the condition (quantity and quality) of forage resources available to cattle, but also influence animal bioenergetics. For example, conditions of abundant high quantity, high quality forage, as is common during mid-summer in western Canada, are likely to lead to lower search times and shorter feeding bouts, with more time spent resting and ruminating. This in turn, is likely to contribute positively to summer cow weight, milk production, and associated calf growth.

Given the importance of animal activity budgets for influencing the bioenergetics (i.e., energy expenditure and/or conservation) of individual animals, these budgets may help explain individual animal performance metrics, including that of the cow/calf production unit, while grazing on spatially expansive rangelands. For instance, cows that spend less time wandering and searching for feed, and have greater innate ability to locate, consume and digest high quality feed, may support greater production, in part by expending less energy. Tracking animal activity on pasture under free-range conditions has historically been difficult, and has often been limited to passive observations by researchers during relatively short fixed time intervals.



*Left: The process of fitting pedometers to track animal movement and activity on pasture. Right: Cattle with fitted pedometers (see rear left leg) to track their activity in open grassland.*

The recent emergence of various pedometer technologies has greatly increased our ability to quantify the activity budgets of livestock, including beef cattle. Similar to wristwatches that track human activity (e.g., steps counts throughout the day), these units contain accelerometers that tally the number of steps taken, in addition to the time spent standing vs lying down. The University of Alberta is undertaking research to characterize the activity budgets of commercial beef cattle grazing while grazing on native rangelands using IceRobotic™ pedometers for tracking cattle activity. Systematic information on the aggregate activity budgets of cattle, collected from late June through late October of the grazing season over multiple years, will be used to quantify the bioenergetics of beef cattle, and relate this information to associated production metrics (including cow/calf weight gain). In addition, obtaining this information for large numbers of cattle (>200) will enable us to search for genomic markers previously collected from these cattle that may explain their activity levels, all the while maintaining important economic traits. Collectively, our goal is to utilize behavioral metrics ascertained directly from cattle on pasture to better understand their role in contributing (negatively or positively) to beef production.



*Example of a dataset for a single cow examined over a 24 hour period during the 2021 grazing season at the Kinsella Research Ranch.*

*This study is supported by the Smart Agriculture and Food Digitalization and Automation Program of Alberta Innovates, Results Driven Agricultural Research (RDAR), the Canadian Agricultural Partnership (CAP), and the Alberta Beef Producers.*

**Contacts:**

Temitope Oloyede  
Graduate Student  
University of Alberta  
toloyede@ualberta.ca

Dr. Edward Bork  
University of Alberta  
edward.bork@ualberta.ca