PROJECT 2013-2018

SUSTAINABLE SOLUTIONS TO IMPROVE ESTROUS DETECTION AND REPRODUCTIVE EFFICIENCY IN DAIRY COWS

DAIRY FARMERS OF CANADA ™

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Number of students trained (MSc, PhD, Post-Doc):	**7**
TOTAL BUDGET	**$597,426**

INVESTMENT PARTNERS

Agriculture and Agri-Food Canada

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OBJECTIVES:

The objectives were to examine physiological, behavioral and environmental factors that can optimize estrous expression and detection, and can therefore, contribute to designing more efficient and sustainable reproductive programs.

KEY OUTCOMES:

Large field trials were completed and indicated that prioritizing detection of estrus in a reproductive program can be as effective as some current programs of timed artificial insemination programs.

- A comprehensive survey on dairy farmer practices for reproduction was completed. The results show a nation-wide picture of some major management and reproductive strategies adopted by farmers as well as their perception of management and technologies adopted.

  Half of producers that participated in the survey acknowledged not meeting their goals for reproductive performance, with estrous detection and conception risk (i.e. not seeing cows in heat or not getting cows pregnant) as the main impediments for reproduction.

- Automated activity monitors measure estrous expression/intensity and have potential as management tools to improve the efficiency of timed AI programs based on estrous detection and therefore, decrease hormone use. Furthermore, intensity of estrus is associated with fertility, suggesting that automated behavioral/activity evaluations can potentially be used as phenotypic markers for genetic selection of superior estrous expression and fertility.

- Changes in lying behaviour at estrus are associated with fertility, suggesting that information on lying behaviour and restlessness could improve the use of activity monitors.

- Heifers and lactating cows expressed estrus differently. In cows, excessive early postpartum body weight loss was associated with increased days open and had a negative impact on the duration and intensity of estrous expression. In heifers, faster growth rates throughout 2-13 months of age (but not around puberty) had a positive impact on estrous expression.

- Overstocking cows did not influence estrous expression but greatly influenced lying/standing behaviour of cows, which negatively impacts cow comfort and health. Gait score, hock score, body condition score and cyclic status strongly impacted fertility and the number of animals detected in estrus.

BENEFITS TO THE DAIRY INDUSTRY

- Results from this research can be readily adopted in reproductive programs to improve their efficiency and reduce hormone use.

- Improved knowledge on sensor data can be used to modify/enhance commercial software for fertility prediction and accuracy of real-time reproduction management.

- Improved knowledge on individual traits related to fertility can be eventually used for genetic selection.