UNIVERSITY of GUELPH

ONTARIO AGRICULTURAL COLLEGE

DEPARTMENT OF ANIMAL BIOSCIENCES

PhD Defence

Novel Approaches to Fertility in Dairy Cattle

Gabriella Dodd

Date: Tuesday July 15, 2025 at 8:30am

The PhD Defence for Gabriella Dodd has been scheduled for July 15, 2025 at 8:30am. The defence will be held online via Teams and in room ANNU 141: https://teams.microsoft.com/l/meetup-join/19%3ameeting_MmIzMTgxNTctOTQ5Ni00MDYzLTg0NTgtODcxMjVhNGY2MWQ1%40thread.v2/0?context=%7b%22Tid%22%3a%22be62a12b-2cad-49a1-a5fa-85f4f3156a7d%22%2c%22Oid%22%3a%22dfbebf32-99ae-4022-a68f-422f93e11c7f%22%7d

Examining Chair: Dr. Alexandra Harlander

Advisors: Dr. Christine Baes & Dr. Filippo Miglior (examiner)

Advisory Committee Member: Dr. Flavio Schenkel

Additional Committee Member: Dr. Eduardo Ribeiro

External Examiner: Dr. Ivan Pocrnic

Abstract:

Dairy cattle fertility is a crucial factor influencing the profitability and sustainability of the industry. Currently implemented fertility traits have low heritabilities due to the heavy influence of the environment and management decisions. The objective of this thesis was to investigate novel approaches to fertility challenges in dairy cattle through a) evaluation of anogenital distance (AGD) as a novel morphological fertility indicator trait, b) evaluation of estrus duration (ED), maximum estrus intensity (MEI), and calving to first estrus (CTFE) windows as novel estrus fertility indicator traits, and c) evaluate the impact of heat stress on first service to conception (FSTC). Estimated heritability of AGD was moderate (0.39) while estrus traits had low heritability (ED: 0.16, MEI: 0.18, CTFE: 0.07). Improved reliability with genomic information was found for AGD while estrus traits had minimal gains in reliability. Breeding value correlations of novel traits with existing traits were low and unfavorable for AGD and low to moderate and favorable for estrus traits. Analysis of heat stress effects identified a temperature-humidity index (THI) threshold of 65 adversely affecting FSTC. Estrus synchronization protocols were found to be more sensitive to heat stress effects than heat detection methods. These findings highlight opportunities for improving dairy cattle fertility through novel trait selection and better management of environmental factors, offering strategies to enhance sustainability and productivity in the dairy industry.